Campaign Finance Regulation with Competing Interest Groups[1]

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Abstract

Regulatory caps on contributions to political campaigns are the cornerstones of campaign finance legislation in many established democracies, and their introduction is considered by most emerging ones. Are these regulations desirable? This paper studies contribution caps in a menu auction lobbying model with limited budgets and costly entry. In the absence of entry, contribution caps improve welfare by "leveling the political playing field". With entry, however, a competition effect and a bargaining effect may arise, resulting in inefficient entry and exit decisions. In particular, a cap may lead to worse policies that the status quo; and even if better policies are chosen, the resulting gain in welfare may be more than offset by the entry costs. Regulation can also lead to the simultaneous entry of competing groups, creating costly rent-seeking on issues previously unaffected by lobbying.

1 Introduction

The pessimistic view on campaign contributions holds that they are little more than bribes, used to buy policies favoring those who can afford them. This view is supported by the political scandals reported in the popular press, and is the main driving force behind efforts to regulate campaign finance around the world.[1] The optimistic view holds that campaign contributions provide valuable information to voters. This is achieved either directly, through the political advertisements they finance, or indirectly, by revealing to the general public private information that contributors have regarding a candidate's quality.[2] It has been argued that campaign finance regulation in the form of caps on contributions to candidates or parties may be welfare-improving even under the optimistic view (Prat, 2002; Coate, 2004; Ashworth, 2006). This paper shows that such limits may hurt welfare even under the pessimistic view. I show that although campaign contributions can buy inefficient public policies, capping these contributions could lead to policies that are even less efficient, and may induce a waste of resources on political organization.

In order to focus on the pessimistic view of campaign contributions, this paper models lobbying as a menu auction in which two competing lobbies (the principals) offer transfers to a politician (the agent) contingent on the different policies he may choose from.[3] I explicitly introduce two distortions in this "market for policies". First, political entrepreneurs may face entry costs, such as the costs of recruiting members, buying infrastructure, hiring lobbyists, or setting up and maintaining segregated funds to comply with regulations. Second, lobbies face limited budgets when making political contributions. In the absence of regulation lobbying leads to an inefficient policy because not all lobbies can pay the politician according to their valuation for the various policies. I first show that when entry costs are zero, a symmetric cap on campaign contributions always implements the efficient policy. To achieve efficiency, the cap may be set at any level below the lowest observed transfer in the status quo. Thus, this benchmark model of lobbying with limited budgets and no entry costs rationalizes contribution caps by formalizing the intuition that such regulations "level the playing field." On the descriptive side, contribution caps are shown to have a "competition effect" by increasing the payoff of the poorer lobby and reducing the payoff of the richer one, and a "bargaining effect", by increasing the joint payoff of the lobbies and reducing the payoff of the politician.

The main results of the paper show that when lobbying costs are positive, a cap on contributions no longer guarantees efficiency, and may reduce social welfare relative to the status quo. The argument starts by noting that, with costly lobbying, the political entrepreneur will not organize

[1] In the US, the Federal Election Campaign Act and its amendments were adopted after the Watergate scandals, and their primary purpose is "to limit the actuality and appearance of corruption resulting from large individual financial contributions" (US Supreme Court, 1976, p26). See Corrado (2005, Ch 2) for more on these regulations.

[2] For economic models based on the optimistic view, see e.g., Austen-Smith (1987), Baron (1994), and Prat (2002).

[3] Bernheim and Whinston (1986) and Grossman and Helpman (1994) are the classic references on menu auctions or common agency. Throughout, I use the term "lobbying" to describe the offering of campaign contributions in exchange for policy favors, as defined formally in Section 2.

a lobby if the resulting change in policy is not worth the costs, or if a policy change cannot occur because the lobby would not have the resources necessary to compete with its opponent. Because the contribution cap increases a previously unorganized lobby's potential payoff, it can induce it to enter the political game. Whenever the social benefits of the resulting policy change are more than offset by the lobbying costs, contribution caps will reduce welfare. By giving lobbies added incentives to enter, regulation can also lead to one lobby's entry and the other one's exit. In this case, a status quo policy biased towards one lobby may be replaced by a policy biased towards the other lobby, and welfare may again be reduced. Whether the initial policy bias was the result of insufficient budgets or large fixed costs is shown to be crucial in determining if contribution caps will improve or hurt welfare. Finally, contribution caps can have negative welfare effects by forcing political organization on new issues, leading to lobbying costs being expended without affecting the policy chosen.

Two stylized facts suggest that contribution caps could indeed give rise to increased, rather than reduced, interest group activity, and asymmetries in the process of entry. First, the introduction of contribution caps is often followed by a general increase in interest group involvement in campaign finance (Drazen et al., 2007). Second, groups that were previously weak players in campaign finance, perhaps because they were focusing their energies on other forms of influence, often increase their activity once caps are introduced.

At the federal level, the decade following the first major campaign finance legislation of 1971-1974 saw a sharp increase in the number of political action committees (PACs), their contributions, and the share of PAC contributions in total campaign spending (Alexander, 1983; Sabato, 1984). Looking more closely at the composition of PAC expenditures, there is a steady increase in the share of contributions from groups other than unions or corporations, who were only minor players in political finance before the reforms. The contributions of these so-called "non-connected" PACs went from 15.9% of corporate contributions in 1974 to 28.6% in 1978 and 39.3% in 1982 (Sabato, 1984, Table I-3). Similar examples can be found at the state level. For example, Missouri introduced contribution limits on corporations and unions in the 2001/02 election cycle. The evidence indicates that prior to these reforms, corporations were usually the stronger players in this competition for political influence.[4] As Table 1 shows, regulations seem to have been effective at reducing the contributions of both labor and business.[5] However, the decline in business contributions was more pronounced, and the ratio of labor to business contributions jumped from 20-35 percent in the previous years to almost 60% in the year the limit was introduced. Labor, the weaker group, seems

[4] Casey and King (1993) describe the low level of labor lobbying relative to business in the 80s in Missouri, and note that "The relatively low level of activity by labor unions and their PACs is a consequence more of large corporate contributions than of lack of labor interest or resources. They simply are not in a position to spend dollar for dollar with corporations and are therefore more cautious with their funds..." (p183). See also Table 1 below.

[5] In the table, "business" corresponds to the sum of contributions by the General Business, Energy, Transportation, and Construction sectors from www.followthemoney.org. Adding Finance, insurance and real estate and Communication and electronics yields the same picture. In every cycle, only about 50% of all contributions were traced back to a specific sector.

	1998	2000	2002
Contribution limits[a]	no	no	yes
Contributions (million $)[b]			
Total	22.11	64.38	50.79
Labor	0.94	1.54	1.30
Business	2.62	6.67	2.23
Labor / Business	35.9%	23.1%	58.3%

[a] Federal Election Commission, www.fec.gov

[b] The Institute on Money in State Politics, www.followthemoney.org

Table 1: Labor and business contributions to legislative candidates in Missouri.

	Total (million $)	**"Other" (million $)**[a]	**Pro-Environment (1000 $)**	**Energy (1000 $)**
IL	110.82	0.70	17	2,304
MI	68.04	1.31	34	647

[a] Main sectors included: Retired, Civil servants, Education, Welfare, Nonprofit institutions

Source: The Institute on Money in State Politics, www.followthemoney.org

Table 2: Contributions to legislative candidates in Illinois and Michigan, 2004.

to have become relatively more influential after the introduction of contribution caps.

As another example, consider Michigan (MI) and Illinois (IL), two neighboring states that are similar in terms of area, population, income, and politics.[6] Illinois is one of the few US states with no limits on contributions from PACs, unions or corporations, while Michigan prohibits direct contributions from firms and unions (except through a PAC), and imposed limits on PAC contributions. As the first two columns in Table 2 show, even though Michigan has lower total contributions, the traditionally weak lobbies included in the "Other" category of www.followthemoney.org tend to contribute more in this state. Similarly, the weak environmental lobby has higher contributions in Michigan, the state with limits, while its strong opponent, the energy sector has higher contributions in Illinois, the state with no limits.[7]

In the absence of systematic evidence or a theory on the effect of contribution caps on competing lobbies, the interpretation of such examples remains speculative. The remainder of the paper examines the theoretical effect of contribution caps and their welfare implications in a common-agency

[6] Area (1000 sq miles): 55.6 (IL), 56.8 (MI); Population in 2005 (million): 12.76 (IL), 10.12 (MI); Median income for a 4 person family in 2003 (1000$): 72.4 (IL), 68.6 (MI) (Bureau of the Census, at http://www.census.gov). Both states are predominantly Democratic, and their legislatures are of comparable sizes (IL: 177, MI: 148, http://www.ncsl.org).

[7] Note also that MI and IL have similar memberships in the Sierra Club, the largest American environmentalist organization (MI: around 20,000, IL: around 26,000, according to www.sierraclub.org) - thus, this measure of environmental preferences is similar in the two states. Similarly, no apparent differences exist between the energy sectors: in 2005, MI had 403 electric utilities with 22,063 employees, while the corresponding numbers in IL were 461 and 23,379 (Bureau of Labor Statistics, www.bls.gov).

lobbying model with costly entry and limited budgets. This framework focused on bribes (rather than information) is useful for at least two reasons. First, as argued above, such regulations are derived from the pessimistic view of campaign contributions. It is useful to start the analysis by rationalizing contribution caps in a benchmark model based on similar premises as the regulations themselves, and asking whether the rationale holds up under realistic departures from this benchmark. Second, given the large number of applied analyses using common-agency models in other contexts, this approach seems to be a useful description of lobbying in settings such as trade policy (e.g., Grossman and Helpman, 1994, Goldberg and Maggi, 1999), environmental policy (e.g., Aidt, 1998, Fredriksson and Ujhelyi, 2006), or labor-market policies (e.g., Rama and Tabellini, 1998). My findings may therefore have implications for the effects of campaign finance regulations in these specific settings.

I know of only two formal studies of contribution caps focused on lobbying, both of which rely on very different modeling. In Che and Gale's (1998) all-pay auction model lobbies offer payments for a "political prize" upfront, and the politician awards the prize to the highest bidder. The equilibrium is in mixed strategies, and the paper shows that contribution caps may increase expected contributions, and may reduce the likelihood that the high-valuation bidder gets the prize. These results are in the same spirit as mine, but this model features a more general policy space, allows the lobbies to reward or punish the politician, and has a pure strategy equilibrium. In Drazen et al.'s (2007) Nash-bargaining model lobbies with perfectly aligned interests bargain with a politician. In that model, a contribution limit that is high enough has a bargaining effect by reducing what a lobby can credibly offer to the politician. My model shows that a similar bargaining effect is present when lobbies have all the bargaining power, as in the menu-auction approach, *and* there is inter-group competition. In addition, caps are shown to have competition effects by helping some lobbies and hurting others.[8] In contrast to both of these studies, this paper offers a benchmark model that rationalizes contribution caps.[9]

Some of my results on the efficiency of entry may have an independent interest because, in contrast to the large industrial organization literature on (in)efficient entry into markets, few results exist on the welfare effects of entry into lobbying.

The remainder of the paper is organized as follows. Section 2 presents the benchmark model of common-agency lobbying with budget-constrained lobbies, and characterizes the inefficiencies that arise due to these limited budgets. It shows that in this benchmark, contribution caps always lead to efficient policies. Section 3 shows the problems that arise when organizing political action is costly: Caps may lead to inefficient policies, and can involve added social costs by forcing political organization even if this is not socially worth it. In Section 4, I discuss implications for

[8] Drazen et al. (2007) also present empirical evidence that US states with contribution caps have more political action committees, which is in line with some of my results below.

[9] There is also a vast empirical literature on the effects of campaign contributions on the behavior of politicians (see Ansolabehere et al. (2003) and Potters and Sloof (1996) for useful surveys), but very few studies examine campaign finance regulation. A recent paper that does is by Stratmann and Aparicio-Castillo (2006), who study the impact of regulations on election outcomes.

regulations that themselves affect the costs of organization, such as disclosure provisions and institutional requirements, and explain some of the potential pitfalls of using both types of regulation simultaneously. I also highlight some implications of the results for the more general question on the efficiency of entry into lobbying. Section 5 discusses extensions and robustness, and Section 6 concludes.

2 Inefficient lobbying and caps on transfers

2.1 The model

A politician has to chose a policy s from an ordered finite set S of possible policies. To convey the intuition more clearly, the main text assumes that S has 3 elements; the general case is considered in Appendix A. Let $S = \{s^B, s^0, s^A\}$, with $s^B < s^0 < s^A$. The policy s affects the welfare of two groups of individuals, $j = A, B$, according to the utility functions $V^A(s)$ and $V^B(s)$. It is assumed throughout that the groups A and B have opposite interests regarding the policies:

Assumption 1 *V^A is strictly increasing and V^B is strictly decreasing in s.*

Thus, A prefers s^A, the "largest" policy, while B prefers s^B, the "smallest" policy. Assume, however, that total utility from the policy, $W(s) \equiv V^A(s) + V^B(s)$, ranks the policies as follows.

Assumption 2 $W(s^0) > W(s^A) > W(s^B)$.

Total utility is maximized by s^0, the *unbiased policy*. In this benchmark model, social welfare is simply $W(s)$, and therefore the unbiased policy is also *efficient*, i.e. it maximizes welfare. Lobby B's favorite policy s^B is the worst from a welfare perspective.

The groups A and B are represented by two "political entrepreneurs", who organize lobbies and collect member contributions in an attempt to influence the politician in his policy choice. Influence takes the form of policy-contingent transfer schedules $t^j(s) \geq 0$ offered by each lobby, where $t^j(s)$ denotes the contribution of lobby j to the politician's campaign funds if policy s is selected. The budget that a lobby has available for influence activities in the given political game is denoted M^j, with $M^A \neq M^B$. A transfer schedule is *affordable* if $t^j(s) \leq M^j$ for all s.

The budget M^j is the share of a lobby's resources (from membership contributions, income from services rendered, etc.) that is available for influencing the politician on a given issue, at a given point in time. The assumption that lobbies face asymmetric budgets captures the notion that some interests involved in a political game are wealthier than others, perhaps because they are more easily organized. For example, groups not actively seeking influence ("unorganized groups") can be represented as having a budget of zero. Budgets may be fixed exogenously in a given game if collecting and allocating funds in the organization takes more time than the window of opportunity available to influence the politician (e.g., before the policy must be chosen). For example, funds might be collected through annual membership dues, fixing the budget for the given year.[10] Similarly, funds might be allocated by the organization's national leadership on an annual basis.[11] In the long run, budgets will be endogenous, and in Sections 3-?? I explicitly model the process through which they are determined.

Lobby j's payoff under policy s is $\pi^j(s) \equiv V^j(s) - t^j(s)$. The politician cares about welfare W and the transfers $t^A + t^B$ according to the utility function $aW(s) + t^A + t^B$, where $a > 0$ is a constant. The politician might value transfers, for example, because they can help him get re-elected by financing a successful election campaign.[12] To break ties, I follow Benoit and Krishna (2001) and assume that there is some smallest monetary unit ε in which contributions are made. To simplify the exposition, I also make the assumption that a is "small" in the following sense.

Assumption 3 *$a < \varepsilon / |W(s) - W(s')|$ for all $s, s' \in S$, $s \neq s'$.*

This assumption will imply that welfare only affects policy choices by breaking the indifference when the sum of transfers is the same across several policies. As discussed in Section 5, relaxing Assumption 3 complicates the algebra without affecting the main results.

With given budgets, the timing of the game is as follows:

1. The lobbies simultaneously offer transfer schedules for the various policies from their budgets.

2. The politician selects a policy.

3. Gross payoffs are realized, and the politician receives the transfers corresponding to the policy from both lobbies.

Before turning to the equilibrium, I briefly discuss the assumptions on the social value of lobbying embodied in the above model. By assuming that welfare $W(s)$ is not directly affected by the transfers t^j, we are treating money in the lobbies' hand as having the same social value as money in the politician's account. It may seem that doing so disregards the direct *social costs* of lobbying many observers worry about, including the social costs of diverting resources away from productive uses and turning them into campaign contributions. However, this is not so. Note that the above formulation takes lobbies' budgets as given, therefore the assumption on welfare is that *once a lobby has collected resources* for the purpose of making transfers to the politician, whether these transfers actually take place only affects welfare through the effect of these transfers on the

[10] Corporations and unions often use a "check-off system" in which donations to the organization's PAC are automatically deducted from a paycheck (see, e.g., Ainsworth, 2002, Ch 9).

[11] Mundo (1992) describes the lengthy decision making process of Common Cause, one of the largest citizen groups in America, as follows "While state units have some discretion over activities within their states, they cannot support policies that are opposed by the national organization... If they wish to do so, they must get the national governing board's approval. The national organization also controls state finances... For example, if the national organization notices that a particular state's budget is being spent too quickly, it will instruct state Common Cause officials to correct the problem. The national organization allocates funds to states according to a formula based on the number of Common Cause members in the state." (p220)

[12] As explained in Section 5, the assumption that transfers enter the politician's utility linearly is not crucial. It simplifies the welfare analysis to follow, without affecting any of the positive results.

policies. The assumption is that welfare is not directly affected when one dollar is transferred from an organized lobby to the politician; it does not say that transferring one dollar from the interested population to the lobby has no welfare effect. The private and social costs of collecting donations from the interested population are modeled explicitly in Section 3 below.

2.2 Truthful equilibrium

The common agency game described above admits a large number of subgame perfect Nash-equilibria. Following Bernheim and Whinston (1986) and Dixit et al. (1997), I focus on "truthful" equilibria, defined and motivated below.

Definition 1 *Letting $\Gamma(M^j)$ denote the set of all affordable transfer schedules given the budget M^j, a* truthful equilibrium *of the lobbying game is a profile $[s(\cdot,\cdot), t^{A*}, t^{B*}]$ with $s(\cdot,\cdot) : \Gamma(M^A) \times \Gamma(M^B) \to S$, $t^{A*} \in \Gamma(M^A)$, $t^{B*} \in \Gamma(M^B)$ such that*
(i) Given the transfer schedules, the politician chooses the policy with the largest total transfer (and picks the more efficient policy in case of indifference):

$$s(t^A, t^B) \in \arg\max_{s \in S}[aW(s) + t^A(s) + t^B(s)].$$

(ii) Given the best response function $s(t^A, t^B)$ of the politician, each lobby maximizes its own payoff holding the other lobby's schedule constant:

$$t^{j*}(s) \in \arg\max_{t^j(s)} V^j(s(t^A, t^B)) - t^j(s(t^A, t^B)).$$

(iii) The lobbies select affordable truthful transfer schedules*, which can be written as*

$$t^{j*}(s) = \max(0, \min(M^j, V^j(s) - b^{j*})), \tag{1}$$

for some non-negative constant b^{j*}.

Given a realized outcome $(s^* = s(t^{A*}, t^{B*}), t^{A*}, t^{B*})$, I will say that "the equilibrium policy is s^*, supported by the schedules $t^{A*}(s)$ and $t^{B*}(s)$," and will generally drop the stars to simplify the notation.

With unlimited budgets, truthful equilibria restrict the lobbies' strategies by requiring that each lobby j pick a constant b^j, and set the schedule $t^j(s)$ so that its net payoff from each policy be at most b^j: $t^j(s) = \max(0, V^j(s) - b^j)$. This is illustrated in the upper panel of Figure 1. The schedule implies that the net payoff π^j as a function of V^j follows the 45° line until $\pi^j = b^j$, and becomes horizontal thereafter. With limited budgets, the same schedule applies as long as $t^j(s) < M^j$ (see (1)). Once $t^j(s) = M^j$, the transfer cannot increase, and therefore the net payoff π^j again rises with V^j one for one, as illustrated on the lower panel.

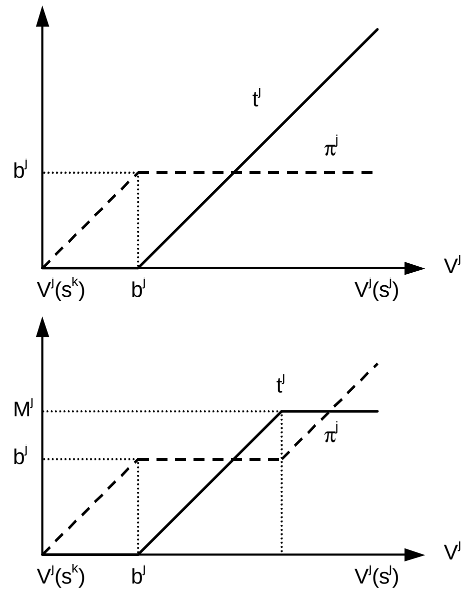

Figure 1: *Truthful transfers and corresponding net payoffs, with (lower panel) and without (upper panel) budget constraints.*

The literature gives several compelling reasons to focus on truthful equilibria (Bernheim and Whinston, 1986; Dixit, Grossman and Helpman, 1997). First, the truthful strategies under (1) are simple, since lobby j's transfer schedule is defined by the constant b^j. Rather than choosing some complicated object, each lobby only decides the payoff it wants to obtain in equilibrium, and adjusts its schedule accordingly. Second, lobbies have essentially nothing to lose by restricting themselves to such strategies, as the best-response set to *any* strategy of the opponent includes a truthful strategy. Third, with unlimited budgets, truthful equilibria are always efficient (see Lemma 1 below) and might therefore be focal among the equilibria. As will be discussed in Section 5, in the present context, additional reasons exist why truthful equilibria are especially interesting. Briefly, truthfulness guarantees that contribution caps are efficient at least in the benchmark model; therefore, focusing on truthful equilibria gives regulation its "best shot" at being welfare improving. Since the paper's goal is to show why contribution caps may be undesirable, a focus on truthfulness ensures that the inefficiency results obtained are fairly strong.

In order to characterize the truthful equilibrium of the model, assume for a moment that the budget of both lobbies is large ($M^j \to \infty$). One can then apply Bernheim and Whinston's (1986) results to obtain the following Lemma (where the subscript u stands for 'unconstrained').

Lemma 1 *If $M^j \to \infty$, the truthful equilibrium is the efficient policy s^0, supported by the schedules $t_u^A(s) \equiv \max(0, V^A(s) + V^B(s^B) - W(s^0))$, and symmetrically for B.*

Proof. See Appendix A. ■

With unlimited budgets, the efficient policy s^0 is always selected. To shorten notation, in what follows $t_u^j(s^0)$, the transfers realized in the unconstrained equilibrium, will simply be denoted t_u^j:

$$\begin{aligned} t_u^A &\equiv V^B(s^B) - V^B(s^0) \\ t_u^B &\equiv V^A(s^A) - V^A(s^0) \end{aligned} \tag{2}$$

In an unconstrained equilibrium, lobby A offers 0 transfer for B's favorite policy; for the equilibrium policy, it offers the *other* lobby's willingness to pay for getting its favorite policy (s^B) over the equilibrium; and it offers the highest transfer on its favorite policy s^A, chosen so as to equalize total transfers on the equilibrium policy and the two favorite policies.[13]

Consider finite budgets. The above discussion implies that the unconstrained schedules derived in Lemma 1 are affordable as long as $M^j \geq t_u^j(s^j)$ for both j. In this case, the budgets do not affect the equilibrium in any way, therefore we can safely ignore this scenario. Budget constraints will affect the equilibrium whenever at least one of the lobbies does not have enough resources to afford $t_u^j(s^j)$. Whenever a constraint binds some of a lobby's out-of-equilibrium transfer offers, but not the equilibrium transfer ($t_u^j \leq M^j < t_u^j(s^j)$), I will say that the constraint is *non-binding*, while a *binding* constraint refers to $M^j < t_u^j$. If a lobby faces a binding constraint that is lower than the budget of its opponent, I will say that the lobby is *weaker* than its opponent (while the opponent is *stronger*). Thus, a weak lobby has less resources than its opponent, and less than what it would be required to pay in an unconstrained truthful equilibrium.

Definition 2 *Lobby A is* weaker *than lobby B if $M^A < \min(t_u^A, M^B)$.*

The following proposition shows that a truthful political equilibrium can only be efficient if neither lobby is weaker than the other.[14] (The proposition also holds with A and B interchanged.)

Proposition 1 *If lobby A is weaker than B, the equilibrium policy is s^B. It is supported by the truthful transfer schedules under (1), with $b^A = V^A(s^B)$ and $b^B = V^B(s^B) - (M^A + \varepsilon)$.*

Proof. This is a special case of Proposition 6 proved in Appendix A. ■

Intuitively, a stronger lobby B is both able (because $M^A < M^B$) and willing (because $M^A < t_u^A = V^B(s^B) - V^B(s^0)$) to outbid its opponent and secure its favorite policy. More generally, as shown in Proposition 6 in Appendix A, a constraint weakening A gradually pushes the equilibrium away from the efficient policy s^0 towards B's favorite. While this result is intuitive, characterizing

[13] Offering the politician equal *total* transfers on s^A, s^0, and s^B is the cheapest way for each lobby to implement s^0 as the equilibrium given the other lobby's schedule. See Grossman and Helpman (2001, Ch 7 & 8) for a textbook presentation of (unconstrained) truthful equilibria.

[14] In fact, as is shown in Appendix A, a stronger result holds, as no *subgame perfect* equilibrium (whether or not truthful) can be efficient if one lobby is weaker than the other. Conversely, it can be shown that if neither lobby is weaker than the other, only the efficient policy s^0 can be chosen in equilibrium. However, when the inequality $t_u^j < M^j < t_u^k$ holds, an equilibrium does not always exist.

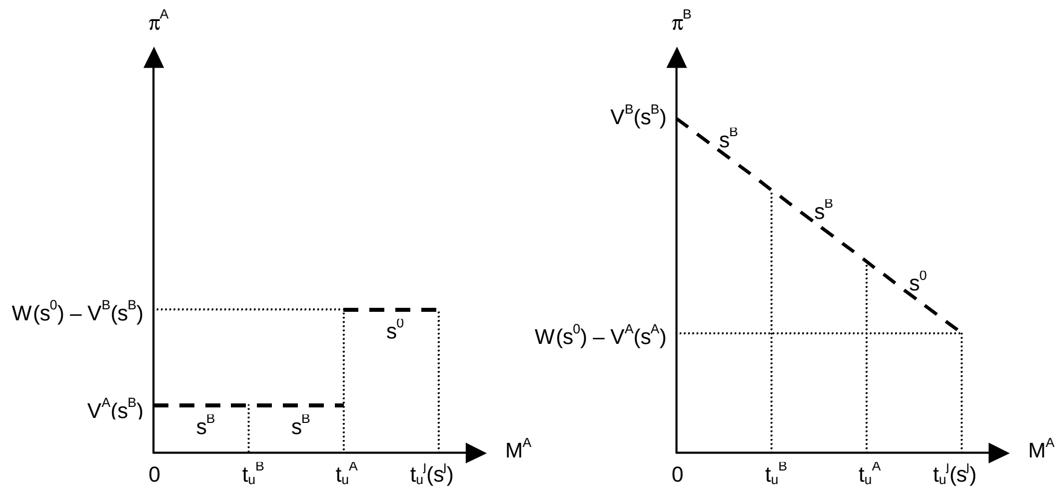

Figure 2: *Payoffs of lobby A (left) and B (right) as a function of* M^A *when* $|S| = 3$, $t_u^A > t_u^B$, *and* $M^A < M^B$.

the equilibrium (in particular, making sure that a pure strategy equilibrium exists), requires some work, as shown in the Appendix.

Figure 2 shows the lobbies' equilibrium payoffs and the policy selected as a function of M^A for $M^A < M^B$. For comparison, the lobbies' unconstrained payoffs, $W(s^0) - V^k(s^k)$, are also indicated. When A's budget is binding ($M^A < t_u^A$), the equilibrium schedules in Proposition 1 imply that B's equilibrium payoff increases as M^A becomes smaller, since B's equilibrium transfer is reduced. In this case, lowering A's budget has no effect on A's payoff since it is already paying 0 in equilibrium.[15] When M^A is non-binding ($t_u^A \leq M^A$), B continues to achieve a higher payoff than in the unconstrained case, while A's payoff is equal to its unconstrained payoff. Thus, asymmetric budgets affect payoffs even if neither lobby is weaker than the other and the equilibrium is efficient. The reason is that a non-binding constraint reduces what A can offer for its favorite policy away from the equilibrium. Such a decrease in a lobby's "threat point" means that the other lobby can offer less for the equilibrium, and therefore achieve a higher payoff. Therefore lobby B's payoff increases as M^A becomes smaller even if M^A is not binding.

2.3 Regulation

This section begins the analysis of regulation in the form of a cap T imposed on transfers from the lobbies to the politician. Since a transfer offer above the cap would not be credible, each transfer schedule has to satisfy $t^j(s) \leq T$ for all s. The following Proposition characterizes the

[15] With more than 3 policies, a smaller M^A can also affect A's payoff by moving the equilibrium further towards B's favorite policy. Appendix A.1 shows that for $M^A < M^B$, π^A is an increasing step-function of M^A.

regulated equilibrium. The remainder of the paper is focused on the comparative statics between the unregulated *status quo* equilibrium described above and this regulated equilibrium.

A cap T satisfying the condition $T \leq \min(M^A, M^B)$ will be called *effective*. A full characterization of the equilibrium with contribution caps is given in Appendix A.2. We find:

Proposition 2 *An effective, symmetric cap T on transfers implements the efficient policy s^0 in the truthful equilibrium. The equilibrium transfer schedules and the resulting payoffs are*

$$t^A(s) = \left\{ \begin{array}{c} T \text{ if } s = s^A \\ \max(0, T - t_u^B) \text{ if } s = s^0 \\ 0 \text{ if } s = s^B \end{array} \right\}, \ t^B(s) = \left\{ \begin{array}{c} 0 \text{ if } s = s^A \\ \min(t_u^B, T) \text{ if } s = s^0 \\ T \text{ if } s = s^B \end{array} \right\} \tag{3}$$

$$\pi^A(s^0, T) = \min(V^A(s^0), V^A(s^A) - T) \tag{4}$$

$$\pi^B(s^0, T) = \max(V^B(s^0) - T, W(s^0) - V^A(s^A)). \tag{5}$$

Proof. See Appendix A.2. ■

In the unconstrained truthful equilibrium, efficiency arises because players pay according to their valuation, and the efficient policy is by definition the one yielding the highest total value, hence the largest total transfer (Lemma 1). When budgets bind, the weaker lobby is unable to pay according to its valuation for some policies and inefficiency might therefore arise (Proposition 1). Because a symmetric cap creates symmetric budgets, truthfulness will again ensure that transfers reflect lobbies' valuations for the different policies. In particular, truthfulness implies that the total transfer on the efficient policy will be no less than total transfers on any other policy. Then, as long as the politician puts some weight on welfare, the efficient policy will be chosen in equilibrium.

The intuition behind Proposition 2 may be what is driving proposals for transfer caps based on the belief that such caps will reduce the "corrupting influence" of campaign contributions, "level the playing field," and yield more efficient policies. As the Proposition shows, in the truthful equilibrium of the benchmark model described above, the intuition holds: an effective cap yields efficiency.[16] Whether this holds under departures from the benchmark is investigated from the next section onwards.

What is the effect of contribution caps on lobbies' payoffs in this model? The payoffs (4) and (5) are graphed in Figure 3 with the solid line on each panel. When $T < t_u^B$, the schedule in (3) implies that A's payoff is constant, while B's payoff declines in T, as it is required to pay more in equilibrium. When $t_u^B \leq T$, (3) implies that changing the cap affects A's but not B's payoff.

The figure illustrates two effects of contribution caps on lobbies' payoffs. First, by "leveling the playing field", the cap increases the payoff of the weaker lobby, and reduces the payoff of the

[16] Note that Proposition 2 also applies in a status quo where neither lobby was weaker than the other. In this case, an effective cap T does not upset the efficient equilibrium.

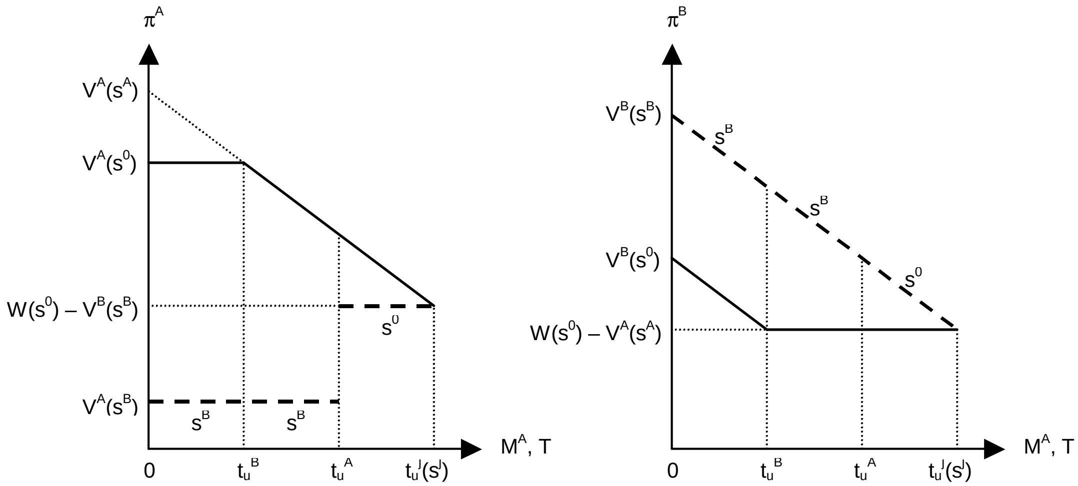

Figure 3: *Payoffs as in Figure 2, and under an effective cap T (solid curves).*

stronger one. I call this the *competition effect.* Second, by vertically summing the curves, one can easily check that the cap increases the joint payoff of the lobbies and reduces the payoff of the politician. This *bargaining effect* comes about because the cap limits the rents that the politician can extract from the competition of the lobbies.[17] These payoff effects form the basis of the entry implications of contribution caps analyzed in the next section.

2.4 Discussion

Before turning to the entry effects of contribution caps in an extended model, I briefly discuss three implications of the benchmark model of lobbying with budget constraints.

1. *Equilibrium contributions tend to be below the cap even if the regulation is effective.* One aspect of "Tullock's puzzle" that real-world campaign contributions are small is that these contributions tend to be below the regulatory caps (e.g., Ansolabehere et. al., 2003). The benchmark model above provides a simple explanation for why this might be the case. When lobbies compete, the equilibrium transfer schedules are such that each lobby reserves its highest contribution offer for out-of-equilibrium policies that it prefers to the equilibrium policy (see (3)). If this was not so, its opponent could reduce some of its contribution offers without affecting the policy chosen, and thereby achieve a higher payoff. Thus, it will generally be the case that while some out-of-equilibrium transfer offers reach the cap T, contributions observed in equilibrium are strictly lower.

[17]This bargaining effect is related to the one identified by Drazen et al. (2007). In their model, a cap constrains the distribution of rents in a Nash bargaining framework between a politician and a set of perfectly aligned lobbies. Here, a cap constrains the distribution of rents that are endogenously created as a result of lobby competition.

2. *Asymmetries do not imply inefficiency.* Asymmetries in the lobbying process (including budgets, membership, and the size of PAC contributions) tend to receive much attention. Are budget and contribution asymmetries informative regarding the efficiency of the policy in this model? As Proposition 1 suggests, limited budgets do not imply inefficiency. Even if a lobby is many times wealthier than its opponent, this will only lead to an inefficient equilibrium if the poorer lobby is also weaker, i.e., if its budget is less than the transfer the lobby would make in an unconstrained equilibrium. Since, as explained in Lemma 1, unconstrained equilibrium transfers depend on what a lobby's opponent loses from the compromise, highly asymmetric budgets are compatible with efficiency whenever the efficient policy requires one of the lobbies to make a large concession. For instance, a rich industry group making large transfers (from a large budget) and a consumer group making small transfers (from a small budget) is compatible with efficiency if the efficient policy is "closer" to the industry's favorite policy than to the consumers' bliss point.

In the 3-policy case, one lobby making a transfer of 0 in equilibrium while the other one making a positive transfer suggests inefficiency, with the paying lobby's favorite policy implemented in equilibrium (Proposition 1). However, one lobby making a 0 transfer in equilibrium is neither necessary nor sufficient to conclude that the equilibrium is inefficient.[18] More generally, the analysis of the general case in Appendix A.1 implies that with more than 3 policies, using the relative size of the transfers to infer the direction of the inefficiency may often lead to the wrong conclusion. In particular the weaker lobby will often be making larger transfers than the stronger one in order to keep the equilibrium as close to the efficient policy as possible.

3. *Without entry effects, a cap never hurts.* Given that the presence of inefficiency has been ascertained and regulation is justified, how low should the cap be? Proposition 2 implies that for any M^j (i.e., whether or not the original equilibrium was inefficient) a symmetric cap below the lowest (positive) observed transfer yields efficiency in a truthful equilibrium. Moreover, any cap that is sufficiently low implements efficiency.[19] This suggests that under the assumptions of this benchmark model, the regulator bears essentially no costs from imposing caps on contributions. If the status quo was inefficient, caps always help. If it was efficient, the cap simply redistributes resources from the politician to the lobbies, without affecting the efficiency of the equilibrium policy. In the rest of the paper, I explain why the result that a wide range of sufficiently low caps are able to implement the efficient policy loses robustness once we move beyond the benchmark model.

[18] For more than 3 policies, Proposition 6 in the Appendix implies that an inefficient equilibrium will involve both lobbies making a positive transfer as long as the equilibrium is in the interior of the policy set S. Conversely, it can easily be shown that if there were only 2 policies, each would result in 0 transfer from one of the lobbies.

[19] In fact, Appendix A implies that imposing a cap below the lowest observed transfer is not necessary for efficiency to obtain. As long as the number of policies is above three but not very large, inefficient equilibria in the interior of S will typically involve both lobbies making transfers that are strictly between 0 and $\min M^j$ in equilibrium. In this case, imposing a cap above the equilibrium transfer (but under $\min M^j$) implements the efficient policy.

3 Lobbying costs

Political entrepreneurship and collecting the resources necessary for lobbying are costly activities. Below, I focus on the "fixed" costs of lobbying, i.e., the costs which the political entrepreneur has to incur in order to set up a lobby and collect a budget, no matter how large that budget is (as long as it is positive). These costs include regulatory burdens or fulfilling other requirements associated with setting up an organization and contacting legislators (such as maintaining an accounting system and hiring staff and lobbyists),[20] as well as the fixed costs of collecting membership donations and forming a budget (e.g., through advertisements and mass-mailing solicitations or fund-raising events: see Gais (1996)). In many cases, fixed costs will arise when the operations and procedures of an existing organization are adjusted to fit the requirements of a new lobbying strategy (Walker, 1991, Ch 6). What matters is that a lobby can only offer campaign contributions to the politician if the fixed cost has been paid.[21]

3.1 Extending the model

Assume that the political entrepreneur representing group j has to incur a cost F^j in order to raise membership contributions and use them in the political game. If F^j is paid, the lobby has a budget M^j available in the political game; if F^j is not paid, the available budget is 0. To make the analysis more transparent, I continue to focus on the 3 policy case $S = \{s^B, s^0, s^A\}$ in the main text. The general results are in Appendix A.3. The timing of the game is now as follows.

1. Each entrepreneur simultaneously decides whether to incur the cost of organizing a lobby. A lobby's budget is M^j if the cost has been paid and 0 otherwise.

2. Organized lobbies simultaneously offer transfer schedules for the various policies from their budgets.

3. The politician selects a policy.

4. Gross payoffs are realized, and the politician receives the transfers corresponding to the policy from the organized lobbies.

I continue to look at subgame-perfect equilibria in which organized lobbies choose truthful strategies in stage 2. Subgame-perfection implies that lobby j will only be organized if its gain in payoff in the political equilibrium is larger than the cost of entry. It follows that a lobby will only enter if it is able to induce a change in the equilibrium policy by doing so. This in turn implies that the four outcomes which might occur in equilibrium are: both lobbies enter and s^0 is implemented

[20] Some of the costs of communicating campaign contribution offers to politicians are reflected in the revenues of the professional lobbying firms. These are steadily increasing, and have been over \$2 billion every year since 2003 (CRP, 2006).

[21] Mitra (1999) and Drazen et al. (2007) also focus on the fixed costs of lobbying.

(unbiased equilibrium with "double entry"), one lobby in with its favorite policy s^j implemented (biased equilibria), or both lobbies stay out and s^0 is implemented (unbiased equilibrium with no entry). These are depicted below. Note that multiple equilibria can arise, but in exactly two ways. Either both biased policies can be equilibria, or the unbiased policy can be an equilibrium with both double entry and no entry.[22]

		B	
		In	Out
A	In	s^0	s^A
	Out	s^B	s^0

Welfare is now given by the sum of gross payoffs, $W(s)$, minus any lobbying costs expended in equilibrium. Thus, welfare is highest in the outcome with no-entry and s^0, since this yields the unbiased policy s^0 maximizing $W(s)$, without wasting any costs of organization. I will refer to this outcome as the *first best*. Depending on the parameters, the welfare ranking of the remaining three possibilities is ambiguous. Having both lobbies organize and implement the unbiased policy s^0 at the cost of $F^A + F^B$ does not necessarily dominate an equilibrium with only one lobby organized and s^j implemented at a cost of F^j. The outcome ranked second in welfare terms (equivalently, the outcome yielding highest welfare subject to there being at least one organized lobby) will be referred to as *second best*.[23] The following result forms the starting point for the analysis of the extended model. (Existence of a pure strategy equilibrium is assumed.[24])

Proposition 3 *Assume unlimited budgets and lobbying costs. There always exists an equilibrium that is at least second-best. In particular, the unbiased policy s^0 is implemented in equilibrium if and only if it is at least second-best. A biased policy s^k is implemented in equilibrium either when it is second-best, or when it is third-best and there is another, second-best equilibrium with the other biased policy, s^j.*

Proof. See Appendix A.3.1. ■

In the benchmark model of no lobbying costs, the truthful equilibrium was efficient whenever budgets were unlimited (Lemma 1). Proposition 3 states an analogous second-best result for unlimited budgets and positive lobbying costs. Here, the truthful equilibrium outcome is at least

[22] To see that biased and unbiased equilibria cannot exist simultaneously, note that a biased equilibrium requires one lobby to enter given that its opponent stays out, and the opponent to stay out given entry by the first lobby. Conversely, the unbiased policy is chosen either when neither lobby enters, or when they both do.

[23] This ranking assumes that forming interest groups only has social value if it leads to better policies. Discussion of this assumption is postponed until after the results; however, it should be noted that evaluating the results below with other social welfare functions is straightforward, and the claim that caps may lead to welfare losses is not restricted to the specific assumption adopted here.

[24] The necessary and sufficient condition for existence is given in Assumption 6 in Appendix A.3.1. Focusing on pure strategies ties in with the pure strategy assumption in the lobbying stage and makes the welfare analysis more tractable.

second-best, modulo a coordination failure which might lead to the third-best outcome being selected while the second-best outcome is also an equilibrium. The intuition for this result comes from the characterization of the unconstrained truthful equilibrium in Lemma 1. Given entry by lobby k, lobby j compares its unconstrained equilibrium payoff, $W(s^0) - V^k(s^k)$, to what it would get by staying out of the political game, $V^j(s^k)$. The difference is exactly equal to the social gain $W(s^0) - W(s^k)$ from having policy s^0 implemented instead of s^k. Thus, each lobby completely internalizes the social benefits of entry given that the other lobby has entered. It follows that the second-best can only fail in an equilibrium where both lobbies take as given the entry of the "wrong" lobby (i.e. the lobby whose favorite policy yields the third-best, rather than the second-best).[25]

In the next two sections, I consider regulation in the extended model with both budget constraints and entry costs. I first describe the effects of a cap introduced in a biased status quo, and then show the impact of a blanket policy of contribution caps in games where the status quo was unbiased. Appendix A.3 shows that the results hold also in the general case of more than 3 policies.

3.2 Contribution caps and a biased status quo

The effects of the cap on the equilibrium policy are described in the following Proposition.

Proposition 4 *Let* $\widetilde{T} \equiv V^B(s^0) - V^B(s^A) - F^B$. *An effective cap* $T \leq t_u^B$ *implements* s^A *if*

$$t_u^B > F^A \text{ and } T > \widetilde{T}, \tag{6}$$

s^0 *if*

$$V^A(s^0) - V^A(s^B) > F^A \text{ and } T < \widetilde{T}, \tag{7}$$

and s^B *if*

$$V^A(s^0) - V^A(s^B) < F^A \text{ and } t_u^A > F^B. \tag{8}$$

Proof. See Appendix A.3.2. ■

In contrast to Proposition 2, an effective cap no longer guarantees that the unbiased policy s^0 is implemented. Depending on the parameters and the size of the cap T, the equilibrium might involve the unbiased policy or either biased policy.[26] In particular, a biased policy will be implemented whenever one of the lobbies decides to stay out in response to the cap. Consider for instance a status quo with s^A implemented. If (8) holds, a cap $T < \min(t_u^B, \widetilde{T})$ implements the worse policy s^B as the unique equilibrium. The reason is that the cap increases B's and reduces A's potential payoff from double entry (the competition effect). As a result, whenever A's lobbying cost is large relative to its utility gain from s^0 over s^B while B's fixed cost is small relative to his gain from s^B

[25] If one of the lobbies ("the incumbent") faces small costs ($F^j < \min(W(s^0) - W(s^k), t_u^k)$), this coordination failure is ruled out and the equilibrium will always be unique and second-best.

[26] If conditions (6)-(8) all fail, no pure strategy equilibrium exists.

over s^0 (condition (8)), B always enters, while A prefers to stay out. As a numerical example, take $V^A(s^A) = 14$, $V^B(s^B) = 13$, $V^A(s^0) = 5$, $V^B(s^0) = 10$, and $V^B(s^A) = V^A(s^B) = 0$. Assume B faces a binding budget constraint of $M^B = 8$, while A has no constraint, and assume the entry costs are $F^A = 6$ and $F^B = 2$. In the status quo, only A enters and obtains s^A. Since $M^B < t_u^B = 9$, B is weaker than A, and he stays out. Consider the effect of a cap $T < 8$. In this case, s^A can no longer be implemented, since B would then enter to get s^0 instead, for a payoff of $8 - T > 0$. Since condition (8) holds, the equilibrium under any such regulation yields policy s^B, with lobby B as the only entrant.

The following Proposition describes the welfare consequences of regulation given a biased status quo.

Proposition 5 *(i) Assume regulation causes a switch from a biased policy s^k to the unbiased policy s^0. Welfare is increased if and only if in the status quo the bias was due to one lobby being weaker than the other.*
(ii) Assume regulation causes a switch from a biased policy s^k to the other biased policy, s^j. Welfare is increased if and only if in the status quo the bias resulted either because one lobby was weaker than the other, or because of a coordination failure among multiple biased equilibria.

Proof. See Appendix A.3.3. ■

Part (i) of Proposition 5 establishes that even if the contribution cap yields a better policy than the status quo, the welfare gain may be more than offset by the increased costs of organization. In particular, regulation can only help social welfare by implementing s^0 if the biased policy s^k was an equilibrium in the status quo *because* of the budget constraint faced by lobby j, i.e., if absent this constraint s^k would not have been an equilibrium. In this case the competition effect of contribution caps helps efficiency by inducing the weaker lobby to enter. However, when policy s^k would have been an equilibrium even without budget constraints - in other words, if the biased status quo was not *caused* by the budget constraint -, then a cap implementing s^0 causes a loss in social welfare. Thus, the welfare effect of a cap will be negative whenever entry costs “matter more” than the budget constraints in determining the status quo equilibrium.[27]

Part (ii) of Proposition 5 shows the two ways in which a cap replacing the biased policy s^k with the biased policy s^j can be welfare-improving. Welfare is raised when either j did not enter in the status quo *because* of its budget constraint, or when the status quo equilibrium was the result of a coordination failure. On the other hand, when policy s^k is in fact second best, introducing a cap can force coordination on the third-best policy s^j by giving j socially excessive incentives to enter. For example, suppose $V^A(s^A) = 15$, $V^B(s^B) = 14$, $V^A(s^0) = 9$, $V^B(s^0) = 7$, and $V^B(s^A) = V^A(s^B) =$

[27] For example, this is likely to be the case whenever one of the lobbies represents a large but diffuse population (e.g., consumers). Even if everyone in the group was willing to spend a small amount on lobbying, which would result in a large budget, organizing such a collection would involve costs that are prohibitive, and the status quo policy will therefore be biased away from such groups.

0. Assume unlimited budgets and entry costs $F^A = 5$ and $F^B = 3$. Note that welfare under s^B is higher than welfare under s^A in the second-best sense: $W(s^B) - F^B = 11 > 10 = W(s^A) - F^A$. In the status quo, both lobbies enter if they are the only entrant, but exit given entry by their opponent. Thus, we have two equilibria, one with s^A and one with s^B. Consider a cap $T = 5$. Since (6) holds while (8) does not, s^A is the unique equilibrium under this regulation.

To the extent that the examples described in the Introduction reflect the causal impact of regulations, they are consistent with the above results. As the model shows, it is theoretically possible that, e.g., the increased activity of weak lobbies in Missouri and the higher activity of such lobbies in Michigan relative to Illinois reflects the asymmetric impact of contribution caps on the entry decisions of competing lobbies. The welfare consequences of entry depend on the value of the resulting policy change relative to the costs of lobbying. According to Proposition 5, whether the biased status quo was due to limited budgets, large fixed costs, or a coordination failure is crucial in determining if contribution caps can be welfare-improving.

3.3 Contribution caps and an unbiased status quo

Consider now a lobbying game where the status quo is unbiased with no entry (the first-best). What is the effect of a cap T in this setting?[28] Since regulation does not affect the payoffs from biased outcomes, if no-entry was an equilibrium in the status-quo, it will always remain an equilibrium under regulation. However, by increasing the potential payoffs from a double-entry equilibrium (the bargaining effect), the cap makes the first-best equilibrium less likely to be unique, as the following Corollary to Proposition 4 shows.

Corollary 1 *Consider a status quo in which the unique equilibrium is s^0 with no entry. If $V^A(s^0) - V^A(s^B) > F^A$, s^0 with double entry will also be an equilibrium under an effective cap $T \leq \min(t_u^B, \widetilde{T})$ (where $\widetilde{T}$ is defined in Proposition 4).*

The Corollary shows that a sufficiently low cap will create an inefficient equilibrium with s^0 and double-entry, even if the first-best outcome was the unique equilibrium in the status quo. By creating an inefficient double-entry equilibrium alongside the first-best equilibrium, regulation creates inefficient lobbying on a policy where interest groups were not previously active.

As an example, take $V^A(s^A) = 14$, $V^B(s^B) = 13$, $V^A(s^0) = V^B(s^0) = 10$, and $V^B(s^A) = V^A(s^B) = 0$. Assume unlimited budgets and entry costs $F^A = 8$ and $F^B = 7$. In the status quo, the gross payoffs from double entry would be $b^A = 7$ and $b^B = 6$, therefore neither lobby finds it worthwhile to enter under any circumstances. However, under a cap $T < 3$, the double entry gross payoffs are 10 for A and $10 - T$ for B. Entry by both lobbies is therefore an equilibrium under such a cap.

[28] Because the status quo is first-best, the cap T is best interpreted as a blanket policy also affecting other lobbying games.

Note that the potential of caps to create a double-entry equilibrium is complemented by the politician's strong interest in such an outcome, as lobbying means campaign contributions. Since *ceteris paribus* caps reduce contributions, a politician wanting to maintain his level of campaign spending may have no other choice than to open up new issues before interest group influence.[29] Some of the examples and trends in US interest group activities described in the Introduction – in particular, the surge in "non-connected" PAC activity whereby new interests became represented in the campaign finance market –, may be consistent with these entry effects of contribution caps.

As mentioned above, in a world with lobbying costs, defining social welfare may involve subtleties. How should the fixed costs of organizing political action be included? One view is that for the purpose of campaign finance regulation such costs of organization can be ignored because they represent a necessary bad present in any democratic political system. Some of these costs might even be socially useful expenditures enhancing political participation with positive externalities. On the other hand, if the alternative to incurring these costs is using existing organizations (e.g., political parties) to provide political representation and services, it is less clear that incurring the costs of creating new organizations serves the public interest. This is especially true if the costs arise because the operations of an existing organization are adjusted to fit a new political strategy. Moreover, as discussed below, various forms of regulation directly influence the magnitude of lobbying costs, and excluding these from social welfare would ignore the costs of such regulations. The analysis above included lobbying costs in the social welfare function, but the results obtained will be relevant as long as at least some of these costs represent social waste.[30]

4 Discussion

4.1 Lobbying costs from regulation

Besides capping contributions, campaign finance regulations typically also include several measures creating fixed entry costs (Gais, 1996). These include, for example, organizational requirements (PAC formation), and systems of accounting and record keeping to satisfy disclosure requirements. The above results have several implications for such regulations.

As Proposition 3 shows, regulation that creates costs for making campaign contribution offers can yield a single or multiple biased equilibria, an equilibrium with double entry, or an equilibrium with no entry. Thus, even if the regulations have some unmodelled social benefit, these should be

[29] Politicians seem to be well aware of this point. As one senator put it, "I have a very good basis for comparison, looking at [my state's] Governor and how he raises money versus how I raise money. Pennsylvania doesn't have contribution limits. I know my Governor doesn't spend 10 percent of the time raising money that I spend. He just doesn't have to spend that kind of time because he is able to raise it in larger chunks..." (S. Hrg. Comm. on Rules & Admin. 106-19, at 4, March 24, 1999, quoted by the Federalist Society at http://www.fed-soc.org).

[30] For example, the result that regulating campaign finance gives incentives for social organization that may be excessive when the costs of organization are taken into account is likely to be relevant as long as these costs are non-zero. If one takes the view that lobbying costs should completely be excluded from the welfare calculations, Proposition 4 provides the conditions under which a sufficiently low cap will yield the socially efficient policy (s^0), and the cap hurts welfare in all other instances.

weighed against the possibility that they might induce one of the lobbies to remain unorganized and let a biased policy (the other lobby's favorite) be implemented in equilibrium.[31]

The above results also have implications for a system which uses both contribution caps and disclosure requirements (or other elements which increase lobbying costs). In particular, regulations which impose significant entry costs on the lobbies may counter any benefits of using contribution caps. As Proposition 2 showed, in the absence of costs, caps may be an effective instrument (as long as other assumptions of the benchmark model also hold). However, some of these benefits may disappear in a world with lobbying costs: In this case, caps may not be able to achieve the second-best, let alone the first best outcome. This suggests that adding transfer caps to a regulatory system already creating large lobbying costs may hurt welfare.

4.2 Lobbying and Entry

In contrast to the large literature on entry into markets in industrial organization, the literature on entry into lobbying is remarkably small. Mitra (1999) studied a menu-auction model of trade policy with fixed entry costs and unlimited budgets. Drazen et al (2007) analyzed entry into a Nash-bargaining lobbying game. A different approach by Felli and Merlo (2006) allows the policymaker to decide on the set of interest groups active in the lobbying process. None of these papers deal with the welfare effects of entry into lobbying. Under what assumptions is the popular belief that entry into lobbying is socially excessive verified? Conversely, is there ground for believing that entry may be socially suboptimal? While a thorough investigation of these questions is outside the scope of this paper, my model does provide some suggestive results.

Consider first the entry model with unlimited budgets. Proposition 3 shows that both lobbies entering the lobbying game is an equilibrium if and only if such double entry is socially efficient. In other words, the menu auction with unlimited budgets studied here gives each lobby socially efficient incentives for entry given that the other lobby has entered. At the same time, when lobbying is costly, organizing both lobbies to obtain an unbiased policy may not be socially optimal. When this is the case, Proposition 3 shows that a coordination failure may arise with the entry of the wrong lobby, yielding an inefficient biased policy. Thus, with unlimited budgets, entry is never socially excessive, and it is never suboptimal, but there is no guarantee that the "right" lobby enters.

If budgets are limited, the above possibility of a coordination failure remains. In addition, entry may now be suboptimal: This will occur if double-entry is socially desirable but one lobby does not possess the resources to compete effectively, as in Proposition 5. Interestingly, just as with unlimited budgets, entry can generally not be socially excessive (apart from the knife-edge case when budgets are exactly equal), This is in contrast to the popular intuition that there are too

[31] Note that the assumption that fixed costs arise for making contribution *offers* is crucial. Things are different if these costs are only incurred if contributions take place on the equilibrium path, i.e., if it is costless for a lobby to approach a politician and make promises. In this case, it is easy to check that every result of the analysis without lobbying costs holds with budgets given by $M^j - F^j$.

many lobbies influencing policy, and it also forms an interesting contrast to the IO results on the business-stealing effects of entry into (imperfect) markets (e.g., Mankiw and Whinston, 1984).[32]

Further investigation of the circumstances under which entry into lobbying is (in)efficient and the analysis of government policies other than contribution caps from this perspective is an interesting avenue for future research.

5 Extensions and robustness

This section briefly reviews how changing some of the formal assumptions would affect the results reported above.

1. *Non-truthful equilibria.* While truthful equilibria have been the focus of the common agency literature since Bernheim and Whinston (1986) described their attractive properties, alternatives are available. For example, Kirchsteiger and Prat (2001) have proposed "natural equilibrium", in which every principal offers a positive transfer on exactly one policy. Would effective caps guarantee efficiency in the benchmark model with no lobbying costs in a non-truthful subgame perfect equilibrium?

Except in the simplest, 2-policy case, the answer is easily seen to be negative. As a counter-example, consider the 3-policy case and suppose that $V^A(s^A) - V^A(s^B) \geq V^B(s^0) - V^B(s^A)$. Then for all $T \in [V^B(s^0) - V^B(s^A), V^A(s^A) - V^A(s^B)]$, the following is an equilibrium implementing $s^* = s^A$: ($t^A(s^A) = t^B(s^B) = T$, and all other t-s set to 0). Note that this transfer profile is a natural equilibrium.

This result is not surprising, given that with more than two policies, inefficient subgame perfect equilibria exist *even with unlimited budgets.* Indeed, this is one of the reasons truthful equilibria, which guarantee efficiency at least when $M^j \to \infty$, might be an attractive refinement in the first place (Bernheim and Whinston, 1986). Thus, while the assumption of truthfulness is restrictive, by focusing on a solution concept under which contribution caps implement efficiency when lobbying costs are 0, this paper has given such regulations their "best shot" at being welfare-improving. Once we move beyond the benchmark of no lobbying costs, we saw that contribution caps may fail to improve welfare even in truthful equilibria. In this sense, the conclusions regarding the negative welfare effect of these regulations are strong.[33]

2. *$a >> 0$.* Relaxing assumption 3 to allow for a larger weight on welfare in the politician's objective function does not affect the results in any important way. In that case, the unconstrained equilibrium transfers under (2) are replaced by $\tilde{t}^j_u = V^k(s^k) - V^k(s^0) - \Delta(s^0, s^k)$, where $\Delta(s^0, s^k) \equiv a(W(s^0) - W(s^k))$, and the definition of lobby j being weaker than k becomes $M^j < \min[\tilde{t}^j_u, M^k -$

[32] Note that competition between lobbies is crucial for this no-excessive-entry result. Clearly, a model where lobbies are identical and distort government policy in the same direction, as in Drazen et al. (2007), would imply that any entry is socially excessive.

[33] This justification for focusing on truthful equilibria is in addition to its other desirable properties identified in the literature (as mentioned in Section 2.2).

$\Delta(s^0, s^k)$]. In other words, lobby j can only be weaker than k if the difference between the two budgets exceeds $\Delta(s^0, s^k)$, the politician's utility loss from catering to k's preferences instead of the efficient policy. With these modifications, the analysis of the benchmark model holds. The results with lobbying costs also go through, with the expressions appropriately modified. The main consequence of allowing for $a >> 0$ in this case is that a lobby will be offering a non-trivial transfer even if it is the only organized lobby in the political game. For example, A has to offer $t^A(s^A) = \Delta(s^0, s^A)$ to achieve its favorite policy in a biased equilibrium. It follows that a cap s.t. $T < \min[\Delta(s^0, s^A), \Delta(s^0, s^B)]$ always implements the first-best outcome with no lobbies organized and s^0 chosen.[34]

3. *The social value of campaign contributions.* The model presented in the main text assumes that contributions from already organized lobbies to the politician are neither directly good nor directly bad: they are purely transfers. In reality, at least some of these transfers finance informative political advertisements which voters might find useful in their electoral decisions. Incorporating some of this social utility into the model is straightforward.[35] In particular, assume that the politician cares about welfare W and the transfers $t^A + t^B$ according to the utility function $aW(s) + U(t^A + t^B)$, where $U' > 0$, $U'' \leq 0$. The function U represents the technology whereby money is transformed into informed voters. Continue to assume that a is 'small' so that welfare only affects policy choices by breaking the indifference when the sum of transfers is the same across several policies. With this modification, it is easy to check that every positive result reported above (including the characterization of the equilibria and the effect of the caps on entry and exit) goes through. What changes is that the caps are now more likely to hurt welfare, because they reduce the total contributions received by the politician, and therefore the value of U. In particular, with lobbying costs, for $U'(0)$ sufficiently large, the no-lobbying outcome will no longer be first-best, and therefore a cap $T = 0$ will no longer guarantee the social optimum. In this sense, the results showing why caps may be undesirable are strengthened by the fact that they ignore the informative value of campaign contributions.

4. *Membership participation.* The model can be extended by incorporating a mechanism through which a lobby's resources are collected from its individual members. Following Moe (1980), assume that the entrepreneur's special skill consists in being able to enforce a redistribution of payoffs (resources) from the set of individuals with similar preferences to members of the organized lobby representing those preferences. In particular, suppose that the entrepreneur is able to redistribute a share γ^j of the net collective gain $\pi^j(s)$ to those who contribute their money to the lobby, thereby creating an Olsonian (1965) selective benefit for lobby-members. Assume the members each give 1\$, and receive $\gamma^j \frac{\pi^j(s)}{n^j}$ if there are n^j members and $\pi^j(s)$ is the lobby's net payoff. In a subgame

[34] The fact that we do observe lobbies organize and make positive contributions might suggest that real-world caps are not low enough to implement this outcome.

[35] Clearly, a model which incorporates the informative value of contributions but ignores electoral competition (by focusing on a single politician) is unsatisfactory. This paragraph merely illustrates why having ignored the informative benefits of contributions may strengthen the reported results.

perfect equilibrium where policy s^* is implemented, new members will join the lobby as long as $\gamma^j \frac{\pi^j(s^*)}{n^j} - 1 > 0$. Therefore $n^j(s^*) = \gamma^j \pi^j(s^*)$ in equilibrium.[36] A lobby's budget, contingent on the equilibrium policy, is the number of members $n^j(s^*)$ times their contributions of 1\$, or $M^j(s^*) = \gamma^j \pi^j(s^*)$. A candidate equilibrium is now *affordable* if and only if $M^j(s^*) \geq t^j(s)$ for all $s \in S$, $j = A, B$. This simple model of group formation captures the intuition that the larger the prospective collective gain, the more resources the entrepreneur is able to collect for the purpose of collective action (Hansen, 1985).

This setup with endogenous budgets typically implies the existence of several self-fulfilling equilibria. If the potential members of a lobby expect it to be more successful, more of them will be willing to pay the membership dues, yielding a larger budget for the lobby, which will in turn make the lobby more likely to be successful. Conversely, members will withhold they patronage when expecting the lobby to fail, and the resulting small budgets may indeed precipitate the group's failure. In this case, in contrast to Proposition 2, a cap does not guarantee an efficient outcome, even in the absence of entry costs. In particular, introducing a cap T to rule out a status quo where s^A was implemented may cause a switch to the less efficient policy s^B. More generally, given the positive relationship between a lobby's payoff and its budget, the entry effects of regulation will be reinforced. For example, when starting from a biased status quo with s^A, a cap reduces A's payoff and budget, and increases both B's payoff and its budget. This means that a cap has the potential of making A weaker than B, in which case s^0 cannot be an equilibrium.

6 Conclusion

In the US, the second piece of major federal campaign finance legislation, the Bipartisan Campaign Reform Act, was introduced in 2002 (following the first major legislation of 1974). In addition, a number of states adopted contribution caps for state elections in the 80s and 90s. Evaluating the effects of these regulations on the policies chosen by decision makers would require data that is seldom if ever available. However, it seems that, at least in the public eye, corruption, the improper influence of wealthy interests, and the resulting distortions in public policies are no less of a concern today than they were prior to the reforms.[37]

Given the absence of systematic data, understanding the theoretical impact of specific campaign finance regulations is especially important. This paper has looked at the welfare effects of capping

[36] I am assuming that members do not consider the possibility that their 1\$ may be pivotal in securing a better policy for the lobby. I am also ignoring any problems arising from non-integer values.

[37] Ten years before the 2002 legislation, one poll found that 74% of registered likely voters agreed with the statement that "Congress is largely owned by the special interest groups". Another poll reported that 75% of voters worried either "a great deal" or a "good amount" that "special interest groups have too much influence over elected officials" (Wertheimer and Manes, 1994, p1129-30). Three years after the legislation 70% of registered voters thought large corporations have "too much influence over politics and government", and 59% and 43% thought, respectively, that wealthy individuals and big labor unions had too much influence (www.demos.org/page422.cfm). In another survey, 56% of US adults thought Members of Congress were "more corrupt than 10 years ago", while only 6% thought they were less corrupt (The Harris Poll #43, May 19, 2005, available at www.harrisinteractive.com.)

contributions, and has argued that such regulations can have undesirable welfare consequences even under pessimistic assumptions about the role of campaign contributions. When political entrepreneurs face positive lobbying costs and may therefore fail to organize, capping contributions makes such organization more likely. When the resulting unbiased policies are not worth the increased costs of political organization, or when such organization causes a shift to other biased, even less efficient policies, caps hurt welfare. Such regulation might also give rise to increased lobbying activity even when policies do not change, leading to further social waste. Perhaps these results point towards an explanation of why there is no indication that the American public's concern about improper influence and policy distortions diminished after three decades of campaign finance regulations centered around contribution caps.

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A Appendix: The general benchmark model

For the general model, assume that the politician chooses a policy s from an ordered finite set S of possible policies, where S has at least three elements ($|S| \geq 3$). Continue to assume that the groups A and B have opposite interests regarding the policies (Assumption 1). The largest element of S, A's favorite policy, is s^A, and the smallest element of S, B's favorite, is s^B. Total utility from the various policies, $W(s) \equiv V^A(s) + V^B(s)$, is assumed to be single-peaked, with a maximum at the unbiased policy $s^0 \in (s^B, s^A)$. The policies $s \in [s^B, s^0)$ are *biased towards* B, and the policies $s \in (s^0, s^A]$ are *biased towards* A. Throughout, I restrict attention to situations in which no two policies yield the same welfare $W(s)$.

Assumption 4 *The function* $W(s)$ *induces a strict ordering* $s^0, s^1, s^2, ..., s^{|S|}$ *of the policies* $s \in S$, *with* $m > m' \Leftrightarrow W(s^m) < W(s^{m'})$ *for all* (m, m').

To be concrete, I also assume that $s^1 > s^0$ (the second-best policy is biased towards A) and $W(s^A) > W(s^B)$ (A's favorite yields higher welfare than B's), as in Assumption 2.

A.1 Characterization

The proof of Lemma 1, which characterizes the $M^j \to \infty$ case, is as follows.

Proof. That the efficient policy s^0 is chosen in a truthful equilibrium follows from Bernheim and Whinston (1986), Theorem 2. To find the truthful contribution schedules supporting this equilibrium, start by noting that both lobbies necessarily offer positive transfers on s^0. If this were not so, and $t^j(s^0) = 0$, s^0 could not be an equilibrium unless $t^k(s^0) > 0$ and $t^k(s^0) \geq t^k(s^k)$. But truthfulness implies that the latter cannot hold.

Given positive transfers, the equilibrium transfers have to be such that the politician is indifferent between s^0 and each of the policies for which the lobbies offer the highest individual transfers. If this was not so, at least one lobby would benefit by reducing all its transfers by a little bit, without changing the equilibrium. Given the assumptions of the model, A's largest transfer is on s^A and B's largest transfer is on s^B. Therefore indifference requires $t^A(s^A) = t^A(s^0) + t^B(s^0) = t^B(s^B)$. Using the definition of truthful contributions, one can easily solve these two equations to find the unknowns b^A and b^B. ■

Next, Proposition 1 can be generalized as follows.

Proposition 6 *If lobby* A *is weaker than* B, *the equilibrium policy is biased towards* B. *In particular, the equilibrium policy* s^* *is defined by*

$$V^B(s^B) - V^B(s^*) \leq M^A < V^B(s^B) - V^B(s) \text{ for all } s > s^*. \tag{9}$$

It is supported by the truthful transfer schedules under (1), with $b^A = W(s^*) - V^B(s^B)$ *and* $b^B = V^B(s^B) - (M^A + \varepsilon)$.

Proof. One can easily check that s^*, as defined in (9), is indeed supported by the given transfer schedules as a truthful equilibrium: given the schedules, the politician chooses s^*, and neither lobby has an incentive to deviate given the other lobby's schedule.

Conversely, suppose the truthful equilibrium implements some policy $\hat{s}$. To show that $\hat{s}$ must be supported by the given schedules and that $\hat{s} = s^*$, I proceed through a series of Lemmas. The following general property of truthful transfer schedules will be used heavily throughout. (It follows directly from the definition (1). Cf. Figure 1.)

$$V^j(s) > V^j(s') \Rightarrow t^j(s) \geq t^j(s') \text{ and } \pi^j(s) \geq \pi^j(s'). \tag{10}$$

The first Lemma shows that *any* subgame perfect equilibrium (not just a truthful one) will involve an inefficient policy.

Lemma 2 *Assume lobby A is weaker than B. Then any subgame perfect equilibrium will involve an inefficient policy biased towards B.*

Proof. Lobby A being weaker than B implies that $M^A < t_u^A = V^B(s^B) - V^B(s^0) \leq V^B(s^B) - V^B(s)$ for all $s \geq s^0$. Therefore $V^B(s) < V^B(s^B) - M^A$ for all such s, implying that lobby B is willing to offer slightly above M^A to disrupt such a policy and achieve s^B. Because $M^B > M^A$, it can afford to make such a payment, and therefore only a policy biased towards B ($s < s^0$) can be part of a subgame perfect equilibrium. ■

Lemma 2 implies that $\hat{s} < s^0$.

Lemma 3 $t^A(s) = M^A$ *and* $t^B(s) = 0$ *for all* $s > \hat{s}$ *such that* $W(s) > W(\hat{s})$.

Proof. Take such an s and assume $t^A(s) < M^A$. Letting $t^A(\hat{s}) + t^B(\hat{s}) = t^*$, note that A could implement s by increasing her transfer $t^A(s)$ to $t^* - t^B(s)$. Policy $\hat{s}$ can only be an equilibrium if A has no incentive to do so, or $V^A(s) - (t^* - t^B(s)) \leq V^A(\hat{s}) - t^A(\hat{s})$. Use $t^A(\hat{s}) = t^* - t^B(\hat{s})$ and rearrange to get

$$V^A(s) - V^A(\hat{s}) \leq t^B(\hat{s}) - t^B(s).$$

Because $s > \hat{s}$ implies $V^B(s) < V^B(\hat{s})$, we know from (10) that B's truthful schedule must satisfy $V^B(\hat{s}) - t^B(\hat{s}) \geq V^B(s) - t^B(s)$, or

$$V^B(\hat{s}) - V^B(s) \geq t^B(\hat{s}) - t^B(s).$$

Combining the two expressions in display, we have $V^A(\hat{s}) + V^B(\hat{s}) \geq V^A(s) + V^B(s)$, contradicting $W(s) > W(\hat{s})$. ■

Corollary 2 $t^A(s) = M^A$ *and* $t^B(s) = 0$ *for all* $s > \hat{s}$.

Proof. Because $\hat{s} < s^0$ by Lemma 2, Lemma 3 implies that $t^A(s) = M^A$ for all $s \in (\hat{s}, s^0]$. But from (10), this means that $t^A(s) = M^A$ for all $s > \hat{s}$. ■

Lemma 4 $t^B(\hat{s}) > 0$, *and* $t^A(\hat{s}) > 0$ *unless* $\hat{s} = s^B$.

Proof. From Lemma 2, $t^B(\hat{s}) > 0 = t^A(\hat{s})$ can only be part of an equilibrium if $\hat{s} = s^B$, as B would otherwise prefer to implement s^B by offering up to $M^A + \varepsilon$ for it (and $t^B(\hat{s}) = t^A(\hat{s}) = 0$ can never be an equilibrium).

Suppose $t^B(\hat{s}) = 0$ and $t^A(\hat{s}) > 0$. Then $\hat{s}$ can only be an equilibrium if $t^A(\hat{s}) \geq t^A(s^A)$. Truthfulness of t^A implies that this is only possible if $t^A(\hat{s}) = t^A(s^A) = M^A$. However, from (10) this also implies $t^A(s^0) = M^A$, and therefore $\hat{s} < s^0$ cannot be an equilibrium unless $t^B(\hat{s}) > 0$. ■

Lemma 4 implies that $|t^A(s^A) - t^B(s^B)| \leq \varepsilon$, otherwise at least one of the lobbies could reduce all its transfers without changing the equilibrium policy. But we know that $t^A(s^A) = M^A$. Observing that $t^B(s^B) = M^A - \varepsilon$ cannot be part of an equilibrium (A could again reduce all its transfers), we are left with the following two possibilities.

(1) $t^B(s^B) = M^A + \varepsilon$. Truthfulness then requires that $b^B = V^B(s^B) - (M^A + \varepsilon) = V^B(\hat{s}) - t^B(\hat{s})$, as stated. Thus, $t^B(\hat{s}) = M^A + \varepsilon - V^B(s^B) + V^B(\hat{s})$, and $t^B(s) = V^B(s) - V^B(s^B) + M^A + \varepsilon$ for all $s < \hat{s}$.

To find $t^A(\hat{s})$, I first show that $t^A(\hat{s}) + t^B(\hat{s}) = M^A + \varepsilon$.

Clearly, since $t^B(s^B) = M^A + \varepsilon$, $\hat{s}$ being an equilibrium requires $t^A(\hat{s}) + t^B(\hat{s}) \geq M^A + \varepsilon$. But since both lobbies will choose their transfer as low as possible, strict inequality can only hold if $t^A(s') + t^B(s') > M^A + \varepsilon$ for some s'. From Corollary 2, we know that $t^A(s) + t^B(s) = M^A$ for all $s > \hat{s}$. Therefore, $s' < \hat{s}$, implying that $W(\hat{s}) > W(s')$.

Truthfulness of t^A implies that $V^A(\hat{s}) - t^A(\hat{s}) = V^A(s') - t^A(s')$. Therefore, $t^A(\hat{s}) + t^B(\hat{s}) = t^A(s') + t^B(s')$ would mean that $M^A + \varepsilon - V^B(s^B) + V^B(\hat{s}) + V^A(\hat{s}) - V^A(s') = V^B(s) - V^B(s^B) + M^A + \varepsilon$ or $V^B(\hat{s}) + V^A(\hat{s}) = V^B(s') + V^A(s')$: a contradiction.

Thus, $t^A(\hat{s}) + t^B(\hat{s}) = M^A + \varepsilon$, and therefore $t^A(\hat{s}) = V^B(s^B) - V^B(\hat{s})$, or $b^A = W(\hat{s}) - V^B(s^B)$.[38]

(2) $t^B(s^B) = M^A$. Truthfulness now requires that $V^B(s^B) - M^A = V^B(\hat{s}) - t^B(\hat{s})$, or $t^B(\hat{s}) = M^A - V^B(s^B) + V^B(\hat{s})$. Just as in the previous case, one can show that $t^A(\hat{s}) + t^B(\hat{s}) = M^A + \varepsilon$, implying that $t^A(\hat{s}) = V^B(s^B) - V^B(\hat{s}) + \varepsilon$. However, we now need $V^A(s^0) - M^A = V^A(\hat{s}) - t^A(\hat{s})$, because if the right hand side is larger, A can implement s^0 by reducing $t^A(\hat{s})$ slightly. This would imply $M^A = V^A(s^0) - W(\hat{s}) + V^B(s^B) + \varepsilon < t^A_u = V^B(s^B) - V^B(s^0)$ or $W(s^0) + \varepsilon < W(\hat{s})$: a contradiction.

What is left to show is that $\hat{s} = s^*$.

Lemma 5 *Policy $\hat{s}$ is not an equilibrium unless $V^B(s^B) - V^B(\hat{s}) \leq M^A < V^B(s^B) - V^B(s)$ for all $s > \hat{s}$.*

Proof. The condition $V^B(s^B) - V^B(\hat{s}) \leq M^A$ is clearly necessary for $\hat{s}$ to be an equilibrium. Suppose there was an $s' > \hat{s}$ s.t. $M^A \geq V^B(s^B) - V^B(\hat{s})$. The above results imply that $t^A(s') = M^A$

[38] For $\hat{s} = s^B$, $t^A(\hat{s}) = 0$, and therefore other anchors $b^A \geq V^A(s^B)$ exist which define the same equilibrium schedule.

and $t^B(s') = 0$. But if $V^B(s') \geq V^B(s^B) - M^A > V^B(s^B) - M^A - \varepsilon = \pi^B(\hat{s})$, lobby B would prefer to increase $t^B(s')$ slightly to implement s'. Therefore $\hat{s}$ would not have been an equilibrium with the above transfer schedules. ■

A.2 Regulation

In the above model, regulation through a symmetric, effective cap T on transfers always yields the efficient policy s^0 in a truthful equilibrium (cf. Proposition 2). To show this, I first argue that no policy other than s^0 can be part of a truthful equilibrium, and then construct the truthful transfer profile implementing s^0.

Proposition 7 *Under an effective cap, no policy other than s^0 can be part of a truthful equilibrium.*

Proof. Assume there is an equilibrium with some policy $s' < s^0$. Truthfulness implies that $V^B(s') - t^B(s') \geq V^B(s^0) - t^B(s^0)$ or

$$V^B(s') - V^B(s^0) \geq t^B(s') - t^B(s^0). \tag{11}$$

Let $t^A(s') + t^B(s') \equiv Q$. Note that for s' to be chosen by the politician, it must be that $Q \geq t^B(s^B)$.

From truthfulness, we know that $t^B(s^B) \geq t^B(s)$ for all s. Therefore A can always implement s^0 by increasing the total transfer on this policy to $t^B(s^B)$ (which the effectiveness of T implies it can always afford to do), and reducing its own transfers on the other policies if necessary. Policy s' can only be an equilibrium if A does not have an incentive make this adjustment, i.e. if $V^A(s') - t^A(s') \geq V^A(s^0) - (t^B(s^B) - t^B(s^0))$. Substituting in $t^A(s') = Q - t^B(s')$ and rearranging, we can rewrite this condition as

$$t^B(s') - t^B(s^0) \geq V^A(s^0) - V^A(s') + Q - t^B(s^B). \tag{12}$$

But the conditions (11) and (12) can only hold simultaneously if $V^B(s') - V^B(s^0) \geq V^A(s^0) - V^A(s') + Q - t^B(s^B)$ or $V^B(s') + V^A(s') \geq V^A(s^0) + V^B(s^0) + Q - t^B(s^B)$. Efficiency of s^0 implies that this inequality can only hold if $Q < t^B(s^B)$: a contradiction.

One may proceed symmetrically to show that no policy $s' > s^0$ can be part of an equilibrium. ■

To construct the truthful transfer schedules supporting s^0 as the equilibrium, I first put some restrictions on the welfare function $W(s)$, derive the schedules, and then explain that essentially the same schedules can be used if the restrictions are lifted.

Assumption 5 *Assume that, for all $m \geq 1$ s.t. $s^{2m-1} < s^A$, we have $s^{2m-1} > s^0$ and $s^{2m} < s^0$.*

Assumption 5 extends Assumption 2: it says that the policy yielding second-highest welfare level is preferred by A, the one yielding the third highest welfare is preferred by B, and so on.

Proposition 8 *Under Assumption 5, the truthful equilibrium involves the following transfer profile. When $T \leq V^A(s^1) - V^A(s^0)$:*

$$b^A = V^A(s^0),\ b^B = V^B(s^0) - T; \tag{13}$$

when $V^A(s^1) - V^A(s^0) \leq T \leq V^A(s^1) + V^B(s^2) - W(s^0)$: the truthful schedules in (1) with

$$b^A = V^A(s^1) - T,\ b^B = W(s^0) - V^A(s^1); \tag{14}$$

when $V^A(s^1) + V^B(s^2) - W(s^0) \leq T \leq V^A(s^3) + V^B(s^2) - W(s^0)$: the truthful schedules in (1) with

$$b^A = W(s^0) - V^B(s^2),\ b^B = V^B(s^2) - T; \tag{15}$$

and so on, until s^A or s^B is reached.[39]

Proof. One can easily check that the given transfer profile supports s^0 as an equilibrium.

Conversely, consider a truthful transfer profile (t^A, t^B) supporting s^0. Since the cap is effective, $T < M^j \leq V^k(s^k) - V^k(s^0)$, therefore lobby k is willing to offer T to get its favorite policy over s^0. It follows that s^0 can only be selected in equilibrium if $T = t^A(s^0) + t^B(s^0) = t^A(s^A) = t^B(s^B)$.

Truthfulness of t^A and t^B then imply that there is some m_A such that A will be offering T for all $s^m | m \geq m_A$, and similarly there is some m_B such that B offers T for all $s^m | m \leq m_B$. Then, it must be that

$$|m_A - m_B| = 1. \tag{16}$$

To see this, suppose that $m_A + 2 \leq m_B$. Then A could profitably deviate by, for example, reducing its transfers on all policies $s^m | m < m_A + 2$ to 0. This would induce the politician to select s^{m_A+2}, as this is the policy yielding the highest welfare for which it gets T (T from A, 0 from B). This must be profitable for A because, from the truthfulness of t^A, it must be that $V^A(s^{m_A+2}) - T > V^A(s^{m_A}) - T \geq V^A(s^0) - t^A(s^0)$. One can reverse A and B to show that $m_B + 2 \leq m_A$ cannot hold.

Property (16) implies that we have two cases to consider. (1) $m_A = m_B - 1$. In this case,

$$b^A = V^A(s^{m_A}) - T. \tag{17}$$

To see why this must hold, note that given $t^A(s^{m_A}) = T$, truthfulness implies that $V^A(s^{m_A}) - T \geq b^A$. But if the inequality was strict, A could profitably deviate by reducing all its positive transfers on policies $s^m | m < m_A$. In this case, s^{m_A} would be the policy with the highest welfare for which T is being offered, and therefore the politician would select this policy.

[39] *More formally, for any integer $m > 0$ s.t. $s^{2m+1} \leq s^A$, we have the following. If $V^A(s^{2m+1}) + V^B(s^{2m}) - W(s^0) \leq V^A(s^{2m+1}) + V^B(s^{2m+2}) - W(s^0)$, then $b^A = V^A(s^{2m+1}) - T$ and $b^B = W(s^0) - V^A(s^{2m+1})$. If $V^A(s^{2m-1}) + V^B(s^{2m}) - W(s^0) \leq V^A(s^{2m+1}) + V^B(s^{2m}) - W(s^0)$, then $b^A = W(s^0) - V^B(s^{2m})$ and $b^B = V^B(s^{2m}) - T$. For any integer m with $s^{2m+1} > s^A$, $b^A = V^A(s^A) - T$ and $b^B = W(s^0) - V^A(s^A)$.*

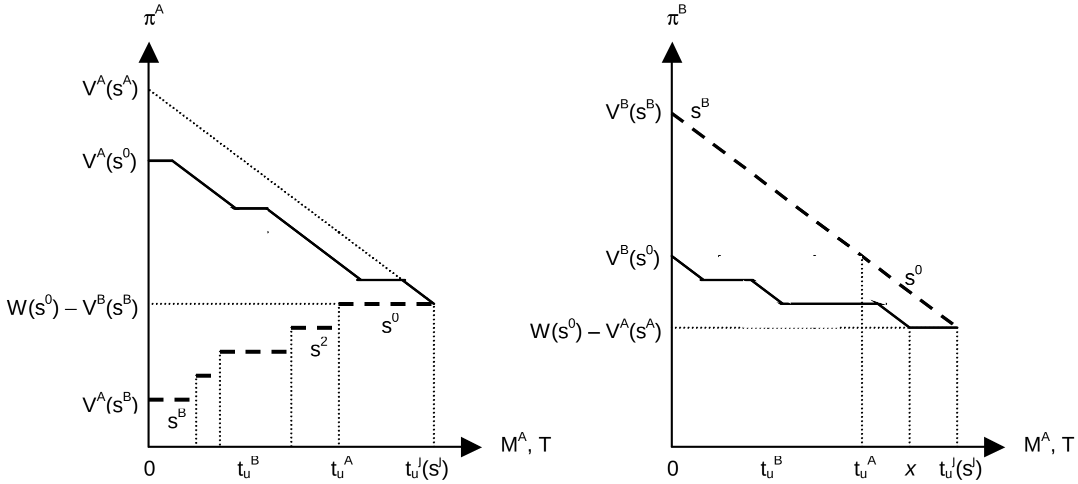

Figure 4: *Figure 3 in the general case.* ($x = V^A(s^A) + V^B(s^{A-1}) - W(s^0)$, *where* s^{A-1} *denotes the policy ranked before* s^A)

Note that (17) implies that

$$b^B = W(s^0) - V^A(s^{m_A})$$

necessarily, to yield $t^A(s^0) + t^B(s^0) = T$. Since, by definition, B offers T for s^{m_B} but not for s^{m_B-2} it must be that $V^B(s^{m_B}) - b^B \geq T > V^B(s^{m_B-2}) - b^B$, or

$$V^B(s^{m_B}) + V^A(s^{m_A}) - W(s^0) \geq T > V^B(s^{m_B-2}) + V^A(s^{m_A}) - W(s^0).$$

(2) $m_B = m_A - 1$. Proceeding exactly as in the previous case, we get $b^A = W(s^0) - V^A(s^{m_B})$, $b^B = V^A(s^{m_B}) - T$, and $V^A(s^{m_A}) + V^B(s^{m_B}) - W(s^0) \geq T > V^A(s^{m_A-2}) + V^B(s^{m_B}) - W(s^0)$. ■

I now explain how this characterization of the equilibrium schedules can be used to obtain the equilibrium for any ordering (i.e. whether or not Assumption 5 holds). Take any ordering, and assign the letter α to each policy biased towards A and the letter β to each policy biased towards B. This yields a series of strings of α-s and β-s. If Assumption 5 holds, each string has only one element: $(s^0, \alpha, \beta, \alpha, \beta, \alpha ...)$; if it does not, some strings will be longer. Since $s^1 > s^0$ by assumption, the letter assigned to the first policy after s^0 is α. Starting from here, look for the last policy of this α-string, and rename it s^1. Next comes a β-string: again, look for its last policy, and rename it s^2. Rename the last policy of the following α-string s^3, and so on until s^A is reached, and number the policies consecutively thereafter. For this ordering, the equilibrium transfer schedules are exactly as given in Proposition 8, where $s^1, s^2, s^3, ...$ stand for the renamed policies.

The status quo payoffs (from Proposition 6) and the payoffs under regulation (from Proposition 8) are illustrated in Figure 4, which generalizes Figure 3 in the text.

A.3 Appendix: Lobbying costs

A.3.1 Proof of Proposition 3

Proposition 3 also holds in the general model. To show this, consider first the following condition.

Assumption 6 *If $W(s^0) - W(s^k) < F^j < t_u^k$ for some (j,k), then $t_u^j < F^k < W(s^0) - W(s^j)$ does not hold.*

We have:

Lemma 6 *Assume both lobbies have unlimited budgets but face lobbying costs of F^A and F^B respectively. A pure strategy equilibrium exists if and only if Assumption 6 holds. In particular, policy s^k is a truthful equilibrium in the lobbying game if both of the following hold*

$$W(s^0) - W(s^k) \quad < \quad F^j \tag{18}$$

$$t_u^j \quad > \quad F^k. \tag{19}$$

Policy s^0 is an equilibrium iff one of the following holds

$$t_u^j \quad < \quad F^k \ \forall(j,k) \tag{20}$$

$$W(s^0) - W(s^k) \quad > \quad F^j \ \forall(j,k). \tag{21}$$

Proof. Policy s^k obtains when k enters but j does not. Given that j stays out, lobby k enters iff the gain from implementing its favorite policy s^k (for a transfer of ε) over s^0 is larger than the cost of entering: $V^k(s^k) - V^k(s^0) > F^k$. The left hand side is just t_u^j. Given that k has entered, Lemma 1 implies that lobby j's payoff in the unconstrained truthful equilibrium minus the fixed cost of entry is $W(s^0) - V^k(s^k) - F^j$. If it doesn't enter, its payoff is $V^j(s^k)$. Therefore entry does not occur and s^k is implemented if and only if $W(s^0) - V^k(s^k) - F^j < V^j(s^k)$, or $W(s^0) - W(s^k) < F^j$.

Policy s^0 is implemented iff either both lobbies stay out, which occurs when $t_u^j < F^k \ \forall j \neq k$, or if both enter, which is the case when $W(s^0) - W(s^k) > F^j \ \forall j \neq k$.

In the remaining cases, ruled out by Assumption 6, there would be no equilibrium. ■

Policy s^0 is an equilibrium either when neither lobby enters (condition (20)), which is the first-best outcome, or when they both do (condition (21)). But condition (21) is equivalent to $W(s^0) - F^j - F^k > W(s^k) - F^k \ \forall(j,k)$, which means that the double-entry outcome is second-best.

Suppose policy s^k is an equilibrium. From (18), this outcome yields higher welfare than the double-entry outcome with s^0, therefore s^k is either second-best or third-best. Suppose policy s^k is not second-best, and instead s^j is. Then there must also be an equilibrium with s^j. To see this, note that s^k being the unique equilibrium would imply $W(s^0) - W(s^k) < F^j$ and $W(s^0) - W(s^j) > F^k$, from Lemma 6. But combining these yields $W(s^j) - F^j < W(s^k) - F^k$, therefore s^j cannot be second-best.

A.3.2 Proof of Proposition 4

Proposition 4 can be verified in the general model by replacing the condition $T \leq t_u^B$ with $T \leq V^A(s^1) - V^A(s^0)$. Under this condition, Proposition 8 implies that the gross payoffs from double entry are $\pi^B(s^0, T) = V^A(s^0)$ and $\pi^B(s^0, T) = V^B(s^0) - T$, respecitvely. It follows that given entry by B, A enters iff $V^A(s^0) - V^A(s^B) > F^A$, and given entry by A, B enters iff $T < \widetilde{T}$. Finally, since regulation does not affect the payoffs from biased outcomes, lobby j will enter to implement the policy s^j iff $t_u^k > F^j$, as seen in Proposition 3. The conditions given in the Proposition follow.

A.3.3 Proof of Proposition 5

Proposition 5 holds also in the general case. The proof is as follows.

(i) Implementing s^0 improves welfare iff $F^j < W(s^0) - W^k(s^k)$. For s^k to be implemented in the status quo, (19) must hold. Lemma 6 therefore implies that welfare is improved if and only if s^k would not be an equilibrium under unlimited budgets. In this case, the status quo with s^k must have been the result of j being weaker than k. Conversely, if s^k would be an equilibrium under unlimited budgets, so that the biased status quo is not due to the budget constraints, implementing s^0 reduces welfare.

(ii) First, note that, from Proposition 4, s^j can only be implemented if

$$W(s^0) - W(s^j) < F^k. \tag{22}$$

For $j = B$, this is implied by $V^A(s^0) - V^A(s^B) < F^A$ in (8), and for $j = A$, it is implied by $V^A(s^1) - V^A(s^0) > \widetilde{T}$, which is required for (6) to hold.

From Lemma 6, (22) implies that s^j would have been an equilibrium under unlimited budgets. Whenever

$$F^j < W(s^0) - W(s^k) \tag{23}$$

also holds, s^j would have been the unique equilibrium, so that the status quo with s^k must have been due to j being weaker than k. Together, (22) and (23) imply that implementing s^j improves welfare. If (23) does not hold, s^j and s^k are both equilibria with unlimited budgets. In this case, regulation increases welfare whenever the equilibrium with s^k selected in the status quo was less efficient.