

# Soft Money and Campaign Finance Reform

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## **Abstract**

We analyze special interest influence on policy when political contributions are regulated with a cap but the regulation contains soft-money loopholes. We formalize the degree of special interest influence as the probability that the politician makes a different policy choice than he would have made in the absence of contributions. The effect of a cap may be non-monotonic. Despite soft-money loopholes, any binding cap reduces special interest influence compared to unregulated contributions. However a complete ban on contributions can result in a higher degree of special interest influence than a binding but non-zero cap.

Keywords: All-pay auction, political contribution limits, explicit ceiling, BCRA, Citizens United.

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“The republican principle demands that the deliberate sense of the community should govern the conduct of those to who they intrust the management of their affairs”

Alexander Hamilton,  
The Federalist Papers, No. 71<sup>1</sup>

“Just as troubling to a functioning democracy as classic *quid pro quo* corruption is the danger that officeholders will decide issues not on the merits or the desires of their constituencies, but according to the wishes of those who have made large financial contributions valued by the officeholder.”

U.S. Supreme Court,  
McConnell v. FEC

A basic premise of representative democracy is that people elect representatives who either share their policy preferences or are willing to act as if they do in order to be reelected. In either case it is likely that politicians have preferences over policy alternatives. However it is often argued that the need to raise money to run a political campaign may weaken the connection between politicians’ policy preferences and their actions, undermining this fundamental premise of representative democracy. The concern is that politicians’ need to raise funds may lead to greater policy influence of large contributors.<sup>2</sup> In order to achieve a “Reduction of Special Interest Influence” (Title I of Public Law 107-155, 107<sup>th</sup> Congress) the Bipartisan Campaign Reform Act of 2002 (BCRA, commonly known as the McCain-Feingold Act) re-regulates campaign contributions. It sets clear limits on “hard money”: Contributions directly to candidates, to political action committees, and to

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<sup>1</sup>The Federalist Papers were published anonymously in support of ratification of the U.S. Constitution. Authorship of number 71 was later claimed by Hamilton, a claim that was confirmed by James Madison.

<sup>2</sup>In 2008 the average cost of a successful campaign for the House of Representatives was \$1.3 million which represents a real increase of 53% in a decade. Over the same period the average real cost of a winning Senate campaign increased by 21% to \$6.5 million. For summary statistics see [www.cfinst.org](http://www.cfinst.org) and [www.opensecrets.org](http://www.opensecrets.org).

It is well documented that institutional contributors appear to be acting as rational investors (see for instance Kroszner and Stratmann, 1998 and Snyder, 1990) and special interest groups lobby members with positions of power in congressional committees more heavily, see Ansolabehere *et al.* (2003) for a literature survey. To establish clear causality between money and voting behavior, Stratmann (2002) examines repeated votes on the same piece of legislation: the repeal of provisions of the 1933 Glass-Steagall Act. The act prohibited bank holding companies from owning other financial services companies. The repeal was rejected by the House in 1991, and it then passed in 1998. It was strongly favored by banking interests but also strongly opposed by insurance and securities interests. Stratmann finds that an extra \$10,000 in contributions was associated with an 8% increase in the probability of a House member voting to repeal the prohibition.

the national parties.<sup>3</sup> However money, like water, always finds an outlet. Critics fear that the existence of unregulated soft-money loopholes may prevent the campaign finance reforms in BCRA from achieving their goal of reducing special interest influence. In this paper we analyze the degree of special interest influence when political contributions are regulated with a cap but the regulation contains soft-money loopholes.

Since BCRA, restrictions on hard-money contributions have resulted in an explosion of soft-money donations to political organizations outside of the scope of the Federal Elections Commission's (FEC) remit and to advocacy groups running issue advertisements. For instance, the spending of so-called 527 political organizations<sup>4</sup> such as EMILY's List and American Solutions for Winning the Future is not under the control of the candidates or political parties. Hence contributions to these organizations are not capped by the FEC. In 2000, before the BCRA, non-party 527 spending on federal elections was \$171 million, 7% of total campaign spending. In the 2004 election cycle, after BCRA, the figure was \$653 million, roughly 17% of total campaign spending.<sup>5</sup> Following the 2004 elections FEC monitoring of direct ties between 527 political organizations and candidates forced the closure of some prominent 527s, but left space for other kinds of 527s, 501(c) advocacy groups and newer "taxable" nonprofit organizations.<sup>6</sup> Soft-money political spending by 501(c)s tripled in the 2008 elections. While the advertisements placed by these groups are typically issue specific, it is generally quite clear which party or candidate they support. Moreover, contributions

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<sup>3</sup>For 2009-10, the act limits an individual's contributions to a candidate or to a candidate committee to a maximum of \$2,400 per election, to a national party committee a maximum of \$30,400 per annum, and there is a \$115,500 biennial limit to overall contributions with built-in increases for inflation. See <http://www.fec.gov/pages/brochures/contriblimits.shtml> for details. Campaign finances for state offices are regulated at the state level. All states except for Illinois, New Mexico, Oregon, Utah and Virginia have hard-money contribution limits. Details on various state level contribution limits are provided by the National Conference of State Legislatures, [www.ncsl.org](http://www.ncsl.org). A number of other countries also have contribution limits. Examples include France, India, Israel, Italy, Japan, Mexico, Spain, Taiwan and Turkey. See [www.aceproject.org](http://www.aceproject.org).

<sup>4</sup>527s are named after the section of the tax code which applies to their financial dealings.

<sup>5</sup>Data from the Wall Street Journal, Mullins (2007) and the Campaign Finance Institute Report dated 25/2/2009 on [www.cfinst.org](http://www.cfinst.org).

<sup>6</sup>American Taxpayers Alliance and Focus on the Family Action are examples for 501(c) organizations, while Catalist and Democracy Alliance are examples of the newer taxable non-profit organizations that emerged in the 2006 election cycle.

to favorable groups are actively sought by politicians.<sup>7</sup> Soft-money donations are often used as a way around the limits on hard-money contributions.

Politicians have full discretion on how and when to spend hard-money contributions. Therefore, these are more highly valued. Soft-money contributions are likely to be a less efficient means of currying favor since, “[t]he absence of prearrangement and coordination of an expenditure with the candidate or his agent . . . undermines the value of the expenditure to the candidate.”<sup>8</sup> However, appropriately directed soft-money contributions can result in at least a portion being used in support of the politician, and hence they are still of value to office holders. The Supreme Court quotes Robert Rozen, a partner in Ernst & Young:

“You are doing a favor for somebody by making a large [soft-money] donation and they appreciate it. Ordinarily, people feel inclined to reciprocate favors. Do a bigger favor for someone – that is, write a larger check – and they feel even more compelled to reciprocate.”<sup>9</sup>

There has been long-standing concern in policy circles that these soft-money loopholes may render contribution caps ineffective. This concern has intensified in the aftermath of the recent U.S. Supreme Court ruling in *Citizens United v. FEC* (2010). The court struck down a provision of the McCain-Feingold Act that prohibits corporations and unions from using their general treasuries to run candidate-specific advertisements in the sensitive window of 60 days before a general election and 30 days before a primary. Critics fear that this change in the law will lead to a flood of corporate soft money. Senator McCain argues that as a result “campaign finance reform is dead.”<sup>10</sup>

The academic literature provides support for this concern indicating that soft money may render contribution limits ineffective. Kaplan and Wettstein (2006), henceforth KW, and Gale and

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<sup>7</sup>The Supreme Court in *McConnell v. FEC* (2003) cites a former party official: “Once you’ve helped a federal candidate by contributing hard money to his or her campaign, you are sometimes asked to do more for the candidate by making donations of hard and/or soft money to the national party committees, the relevant state party (assuming it can accept corporate contributions), or an outside group that is planning on doing an independent expenditure or issue advertisement to help the candidate’s campaign.”

<sup>8</sup>US Supreme Court, *Buckley v. Valeo* (1976).

<sup>9</sup>US Supreme Court, *McConnell v. FEC* (2003).

<sup>10</sup>CBS interview with Senator McCain (24/1/2010). President Obama also voiced strong concerns over this ruling in his 2010 State of the Union Address.

Che (2006), henceforth GC, analyze the effect of a hard-money contribution cap in a framework where it is possible to give more than the specified limit albeit with a risk of being caught, imposing an additional cost. But with a monetary punishment for exceeding the limit, the cap does not alter the relative strengths of the lobbyists so it does not change the intensity of their competition (GC Proposition 1, Corollary 1). The cap is completely neutral on lobbying costs and on the policy outcome of the competition. One interpretation of the KW/GC cost function with a kink at the cap is that there may be alternate less efficient means of contributing if the lobbyists choose to contribute more than the cap. Under this interpretation KW/GC imply that with any soft-money loopholes the discussion of a contribution cap is a red herring: A hard-money contribution cap has no effect on lobbying effort nor on the outcome of the lobbying competition.

KW/GC study the effect of a contribution cap under the assumption that the politician is indifferent between the policy positions of the lobbyists. However, the policy concern is whether politicians' inclination to reciprocate favors will overwhelm Hamilton's "deliberate sense of the community." In KW/GC there is no sense in which special interest money can overwhelm the politician's natural inclinations; no sense in which it can have an undue influence. However there is extensive empirical evidence indicating that the policy position of the politician is an important determinant of politician behavior. Of the 36 empirical papers which study ideology or party affiliation surveyed in Ansolabehere *et al* (2003), all but one find policy position significant for predicting congressional roll-call votes.

In this paper we extend the literature by incorporating politician preferences into the KW/GC framework. Modeling politicians with policy preferences is standard in the political lobbying literature. For instance, in Grossman and Helpman (1996) politician preferences are derived from the preferences of their constituents and in equilibrium lobbyists have a stronger electoral motive to contribute if they have a lot to gain from their preferred policy alternative. In the access fee model of Austen-Smith (1995), contributions are a means of signaling the degree to which the lobbyists' preferences are aligned with those of the politician. In Denzau and Munger (1986), lobbyists contribute to buy political favors and *ceteris paribus* they tend to donate to legislators who do not have strong policy preferences since they are easier to sway.

We analyze the effects of a hard-money contribution limit containing soft-money loopholes in an environment where the incumbent politician has a policy preference but his policy choice may

be swayed by political contributions. The academic and policy literature has often focused on the amount of money in politics to measure the effectiveness of campaign finance reform. However the concern of the legislation is not that political contributions are an onerous burden on society,<sup>11</sup> but rather that they may alter the behavior of the agents involved. The introduction of politician preferences permits analysis of whether contribution caps can achieve their stated aim of reducing special interest influence on policy outcomes. We formalize the degree of influence of money on policy as the equilibrium probability that political contributions induce the politician to make a policy choice that he would not have made in the absence of contributions. This measure of the degree of influence of monied interests captures the concern that policy may be driven by money.

In contrast to the previous literature, we show that contribution caps with soft-money loopholes are not neutral on equilibrium lobbying costs nor on policy outcomes. When the politician has a preference over policy alternatives, even if the lobbyists have identical contribution technologies, we show that a hard-money contribution cap with soft-money loopholes does not have a symmetric effect on the lobbyists. The cap alters the lobbyists' relative reliance on soft money because the lobbyist with the policy position that is not favored by the politician must exceed the contribution of the other lobbyist to overcome the policy preference of the politician. Hence the cap alters the competitiveness of the contest.

The effect of a cap on the degree of special interest influence is non-monotonic whenever a ban on hard-money contributions does not fully suppress all competition via soft money. In the absence of soft-money loopholes the influence of special interest money would be minimized with a ban on hard-money contributions. This is not the case with soft-money loopholes. Special interest influence is minimized with a binding but non-zero hard-money contribution cap. If the cap is not too restrictive such that it is only effectively binding for the lobbyist with the policy position the politician does not favor, a relaxation of the cap will only directly benefit him, leading to an increase the degree of the special interest influence. However, a relaxation of a relatively restrictive cap will lead to a decrease in the degree of special interest influence. If there is a complete ban on hard-money donations and both lobbyists resort to soft-money contributions, a less restrictive cap reduces the cost of contributions for both lobbyists. The decline in the cost is proportionally larger for the lobbyist

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<sup>11</sup> Levitt (1995) points out that the amount spent on politics in the United States is roughly the same as the amount spent on chewing gum. Campaign spending for federal offices in the U.S. 2008 election cycle was roughly 0.03% of GDP.

with the favored policy position since the lobbyist with the unfavored policy position needs to contribute more to overcome the politician's policy preference. The relaxation of the cap benefits the lobbyist with the policy position the politician favors, decreasing the degree of special interest influence.

The main contribution of the paper is the analysis of the influence of special interest money on policy when there is a contribution cap with soft-money loopholes. The results are illustrated with a discussion of the optimal policy response to the recent Supreme Court ruling on *Citizens United v. FEC*. The ruling alleviates some of the inefficiencies in soft-money contributions and hence alters the level of hard-money contributions cap that would minimize the influence of special-interest money. A secondary contribution of the paper is the analysis of aggregate contributions. The previous literature finds that a cap is completely neutral on lobbying costs if there are soft-money loopholes. We show that a more restrictive cap may lead to increased aggregate contributions while reducing the degree of special interest influence. This highlights the weakness of using aggregate contributions in the evaluation of the effectiveness of campaign finance legislation. We also show that a more restrictive cap can reduce political contributions to senators and to politicians from large or urban districts while resulting in increased contributions to house members and politician from smaller or rural districts.

## **I. Model**

Two risk-neutral lobbyists compete for a prize that will arise due to a policy choice of an incumbent politician. The prize may be a vote on impending legislation but it may also be more subtle, such as attaching a rider to an upcoming bill creating a regulatory loophole, or altering the legislative calendar.<sup>12</sup> The value of the prize to lobbyist  $i$  is denoted by  $v_i \forall i \in \{1,2\}$  and  $v_1 > v_2 > 0$ . The lobbyists make simultaneous monetary contributions that are valued by the politician in power. These contributions can take the form of hard-money donations directly to the politician,  $h_i$ , and/or

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<sup>12</sup>For instance, in *McConnell v. FEC* (2003) the Supreme Court argues that manipulations of the legislative calendar lead to Congress' failure to enact, among other things, generic drug legislation, tort reform and tobacco legislation; "Donations from the tobacco industry to Republicans scuttled tobacco legislation, just as contributions from the trial lawyers to Democrats stopped tort reform; To claim that such actions [altering the legislative calendar] do not change legislative outcomes surely misunderstands the legislative process."

contributions of soft money,  $s_i$ , to groups supportive of the politician. Hard-money donations cannot be higher than the hard-money contribution limit,  $m \in [0, \infty)$ .

While the politician has full discretion on the spending of hard-money contributions, soft-money spending is not under his direct control. Soft money may be spent at inopportune times, or in a manner that does not mesh with the politician's overall strategy, or some of it may be used for other purposes altogether. Hence we assume that to the politician one dollar of soft-money is worth  $1/(1+a)$  dollars of hard money where  $a$  measures the relative inefficiency of soft-money donations and  $a > 0$ .<sup>13</sup> To the politician, the value of a donation package  $(h_i, s_i)$  is given by its hard-money equivalent  $x_i$ :

$$x_i = h_i + \frac{s_i}{(1+a)} \quad (1)$$

Clearly a lobbyist who attempts to sway the politician's decision with a contribution less than  $m$ , will make all his donations in hard money. But if he wants to contribute more than the limit he will contribute the maximum amount in hard money and the rest via soft-money donations.<sup>14</sup>

It will prove useful to describe the lobbyists' equilibrium donations in terms of their hard-money equivalents. This is without loss of generality as the composition of donations can be easily recovered,

$$\begin{aligned} h_i &= \min(x_i, m) \\ s_i &= \max(0, (x_i - m)(1+a)) \end{aligned} \quad (2)$$

The cost efficient way of making a hard-money equivalent contribution of  $x_i$  results in a cost function:

$$c(x_i) = h_i + s_i = \begin{cases} x_i & \text{if } x_i \leq m \\ x_i + a(x_i - m) & \text{if } x_i > m \end{cases} \quad (3)$$

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<sup>13</sup>Of course there are times when soft money affords third-party groups the ability to engage in activities that the politician would like to officially distance himself from. This plausible deniability can itself have a value. Nevertheless, overall hard-money contributions seem to be more highly valued by politicians.

<sup>14</sup>With politician preferences the effect of a rigid cap where there are no soft-money loopholes is analyzed in Pastine and Pastine (2009).

As in KW/GC the cost function is continuous. If lobbyist  $i$  wins the prize, his payoff is  $v_i - c(x_i)$ . If the rival wins, lobbyist  $i$ 's payoff is  $-c(x_i) \forall i \in \{1, 2\}$ . Since hard and soft-money contributions are sunk, this political lobbying game is an all-pay auction.<sup>15</sup>

The politician has a preference over the policy alternatives supported by the two lobbyists. The preference may have an ideological basis or it may be induced from the preferences of the constituents who will be voting in the future. The interest groups lobby the politician and the politician awards the prize based on the contributions and his preference.<sup>16</sup> The intensity of the preference for the policy position of lobbyist 2 is put into monetary terms, denoted by  $\gamma \in (-\infty, \infty)$ . For example  $|\gamma|$  could represent the expected future campaign costs required to offset the effect of taking a policy position that is unpopular in the politician's district. If the politician favors lobbyist 2's position  $\gamma > 0$ . If the politician favors lobbyist 1's position,  $\gamma < 0$ . The politician awards the prize to lobbyist 1 if  $x_1 > x_2 + \gamma$  and to lobbyist 2 if  $x_1 < x_2 + \gamma$ .<sup>17</sup> In case of a tie each contestant has an even chance of winning the prize. The rules of the game, the valuations of the lobbyists and the preference of the politician are common knowledge.<sup>18</sup>

Simple backward induction in the one-shot game that is analyzed here would have the politician taking his preferred action regardless of contributions since all contributions are sunk. Hence there would be no contributions. Thus implicitly we are assuming that this one-shot game is embedded in a repeated setting so that the politician has an incentive to reward high contributions in order to keep them coming in the future. However, as long as contributions, preferences and actions

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<sup>15</sup>The all-pay auction without a cap has been analyzed by Hillman and Riley (1989) and Baye *et al.* (1993, 1996). The results in Siegel (2009) are applicable with or without a cap. See Yildirim (2005) for a contest where players have the flexibility to add to their previous efforts and see Kaplan, Luski and Wettstein (2002) for a model where the size of the reward is a function of the bid.

<sup>16</sup>In 2003 the Supreme Court in *McConnell v. FEC*, cites one former Senator describing influence purchased by soft-money donations as follows: "Too often, Members' first thought is not what is right or what they believe, but how it will affect fundraising. Who, after all, can seriously contend that a \$100,000 donation does not alter the way one thinks about—and quite possibly votes on—an issue? . . . When you don't pay the piper that finances your campaigns, you will never get any more money from that piper. Since money is the mother's milk of politics, you never want to be in that situation."

<sup>17</sup>Here we specify a fixed prize with a deterministic allocation rule. As in the previous literature, this results in a discontinuous payoff function and equilibrium only in mixed strategies. In reality the prize itself may be a function of contributions and/or the allocation rule may be non-deterministic. Equilibrium in these cases will be quite different, however the main result of the paper continues to hold. See footnote 26 after Result 2.

<sup>18</sup>Konrad (2002) analyzes an all-pay auction with additive preferential treatment, equal bidder valuations and no cap. We extend Konrad (2002) to allow bidders with different valuations and introduce a contribution cap.

are common knowledge the same lobbyists do not necessarily need to be involved in repeated contests.

It will prove useful to introduce some notation in order to write the equilibrium strategies more concisely. Define  $\bar{x}_i$  as the level of contributions where  $c(\bar{x}_i) = v_i$ . Hence  $\bar{x}_i$  is the maximum hard-money equivalent contribution the lobbyist would ever be willing to make and is given by:

$$\bar{x}_i = \begin{cases} v_i & \text{if } v_i \leq m \\ \frac{v_i + am}{1+a} & \text{if } v_i > m \end{cases} \quad (4)$$

Let  $f$  denote the lobbyist whose policy is favored by the politician and  $u$  denote the lobbyist with the unfavored policy. So if  $\gamma > 0$ ,  $f=2$  and  $u=1$ , while if  $\gamma < 0$ ,  $f=1$  and  $u=2$ . The ‘‘Advantaged’’ lobbyist,  $A$ , is the lobbyist with the highest reach:  $A$  is the lobbyist who can have a positive payoff by contributing enough to win even if his rival is giving her maximum willingness to contribute. So lobbyist  $u$  is the advantaged lobbyist if  $\bar{x}_u \geq \bar{x}_f + |\gamma|$  and lobbyist  $f$  is the ‘‘Disadvantaged’’ lobbyist  $D$ . Similarly, lobbyist  $f$  is the advantaged lobbyist if  $\bar{x}_f > \bar{x}_u - |\gamma|$ ,  $f=A$  and  $u=D$ . A ‘‘binding cap’’ is a cap which is lower than the maximum of the upper bounds of the no-cap equilibrium contribution supports of the lobbyists. A ‘‘more restrictive cap’’ refers to a smaller  $m$  when the cap is binding. ‘‘Contribution’’ refers to the sum of hard and soft-money contributions.

## II. Equilibrium

The lobbyist with the policy position that is not favored by the politician must contribute at least the hard-money equivalent of  $|\gamma|$  in order to have a non-zero chance of winning. If the preference of the politician is too strong,  $v_u \leq |\gamma|$  even if the favored lobbyist makes no contribution it would not be worthwhile for the unfavored lobbyist to contribute since the cost of contributing the hard-money equivalent of  $|\gamma|$  is greater than or equal to  $|\gamma|$ . Hence irrespective of the level of the cap, when  $\gamma \leq -v_2$  ( $u=2$ ) or  $\gamma \geq v_1$  ( $u=1$ ), equilibrium is only in pure strategies where neither lobbyist contributes.

If the preference of the politician is not too strong,  $\gamma \in (-v_2, 0) \cup (0, v_1)$  it may be possible to suppress all competition with a cap that is restrictive enough if soft-money contributions are sufficiently inefficient. Competition is completely suppressed if the cost of a hard-money equivalent contribution of  $|\gamma|$  meets or exceeds the value of winning the prize for the lobbyist with the unfavored

policy position:  $|\gamma| + a(|\gamma| - m) \geq v_u$ . So the least restrictive cap that can suppress all contributions is given by:

$$m^* = \frac{(1+a)|\gamma| - v_u}{a} \quad (5)$$

If  $(1+a)|\gamma| < v_u$  then  $m^* < 0$  and competition cannot be completely suppressed no matter how restrictive the cap may be. Competition will simply be via soft-money contributions if all hard-money contributions are banned. If soft money is sufficiently inefficient, *i.e.*  $(1+a)|\gamma| > v_u$ , then  $m^* > 0$ . In that case for all  $m \leq m^*$  competition is completely suppressed. Neither lobbyist contributes and the prize is allocated to the lobbyist with the favored policy alternative.

Proposition 1 below describes the equilibrium for any set of parameter values where there is competition between lobbyists and  $\gamma \neq 0$ . Equilibrium does not exist in pure strategies. The best response to a contribution of  $x'$  by the favored lobbyist is either to contribute  $x' + |\gamma| + \varepsilon$  or nothing. In either case the favored lobbyist's choice of  $x'$  would not be optimal. Define the interval  $[b, c]$  as the empty set whenever  $b \geq c$ , and similarly define open intervals. We can treat the no-cap case as  $m \rightarrow \infty$ .

**Proposition 1:** For all  $\gamma \in (-v_2, 0) \cup (0, v_1)$  and  $m > m^*$  equilibrium is only in mixed-strategies and it is characterized by unique probability density functions  $F_f(x)$  and  $F_u(x)$  for the favored lobbyist's and the unfavored lobbyist's hard-money-equivalent political contributions, respectively. These distributions are continuous in  $m$ .

(i) When  $\gamma \in (-v_2, 0) \cup (v_1 - v_2, v_1)$  or when  $\gamma \in \left(\frac{v_1 - v_2}{1+a}, v_1 - v_2\right]$  and  $m \leq \frac{(1+a)(v_2 + \gamma) - v_1}{a}$ , then  $f=A$  and  $u=D$ . The unique equilibrium distribution functions are given by:

$$F_u(x_u) = \begin{cases} \frac{v_f - c(\bar{x}_u - |\gamma|)}{v_f} & \text{for } x_u \in [0, |\gamma|] \\ \frac{v_f - c(\bar{x}_u - |\gamma|) - |\gamma| + x_u}{v_f} & \text{for } x_u \in (|\gamma|, \min(m + |\gamma|, \bar{x}_u)] \\ \frac{v_f - c(\bar{x}_u - |\gamma|) - am + (1+a)(x_u - |\gamma|)}{v_f} & \text{for } x_u \in (m + |\gamma|, \bar{x}_u] \\ 1 & \text{for } x_u \in (\bar{x}_u, \infty) \end{cases}$$

$$F_f(x_f) = \begin{cases} \frac{|\gamma| + x_f}{v_u} & \text{for } x_f \in [0, \min(\max(0, m - |\gamma|), \bar{x}_u - |\gamma|)] \\ \frac{(1+a)|\gamma| - am + (1+a)x_f}{v_u} & \text{for } x_f \in [\max(0, m - |\gamma|), \bar{x}_u - |\gamma|] \\ 1 & \text{for } x_f \in [\bar{x}_u - |\gamma|, \infty) \end{cases}$$

(ii) When  $\gamma \in \left(0, \frac{v_1 - v_2}{1+a}\right]$ , or when  $\gamma \in \left(\frac{v_1 - v_2}{1+a}, v_1 - v_2\right]$  and  $m > \frac{(1+a)(v_2 + \gamma) - v_1}{a}$ , then  $f=D$  and  $u=A$ . The unique equilibrium distribution functions are given by:

$$F_u(x_u) = \begin{cases} 0 & \text{for } x_u \in [0, |\gamma|] \\ \frac{-|\gamma| + x_u}{v_f} & \text{for } x_u \in (|\gamma|, \min(m + |\gamma|, \bar{x}_f + |\gamma|)] \\ \frac{-(1+a)|\gamma| - am + (1+a)x_u}{v_f} & \text{for } x_u \in (m + |\gamma|, \bar{x}_f + |\gamma|] \\ 1 & \text{for } x_u \in (\bar{x}_f + |\gamma|, \infty) \end{cases}$$

$$F_f(x_f) = \begin{cases} \frac{v_u - c(\bar{x}_f + |\gamma|) + |\gamma| + x_f}{v_u} & \text{for } x_f \in [0, \min(\max(0, m - |\gamma|), \bar{x}_f)] \\ \frac{v_u - c(\bar{x}_f + |\gamma|) - am + (1+a)(x_f + |\gamma|)}{v_u} & \text{for } x_f \in [\max(0, m - |\gamma|), \bar{x}_f] \\ 1 & \text{for } x_f \in [\bar{x}_f, \infty) \end{cases}$$

**Proof:** Appendix A.

The proposition characterizes the equilibrium in two parts depending on which lobbyist has the advantage in the competition. If the politician prefers the policy position of the high-valuation lobbyist  $\gamma \in (-v_2, 0)$ , the favored lobbyist has the advantage in the competition both due to his high valuation of the prize and due to the politician's preference. If the politician strongly prefers the policy position of the low-valuation lobbyist,  $\gamma \in (v_1 - v_2, v_1)$ , once again the favored lobbyist has the advantage in the competition, since the politician's preference overwhelms the favored lobbyist's handicap arising from his lower valuation,  $A=f$ . If the preference for the policy position of the low-valuation lobbyist is very mild,  $\gamma \in (0, (v_1 - v_2)/(1+a)]$ , the preference cannot overpower high-valuation lobbyist's advantage; The high-valuation lobbyist has the advantage despite the preference of the politician,  $A=u$ .

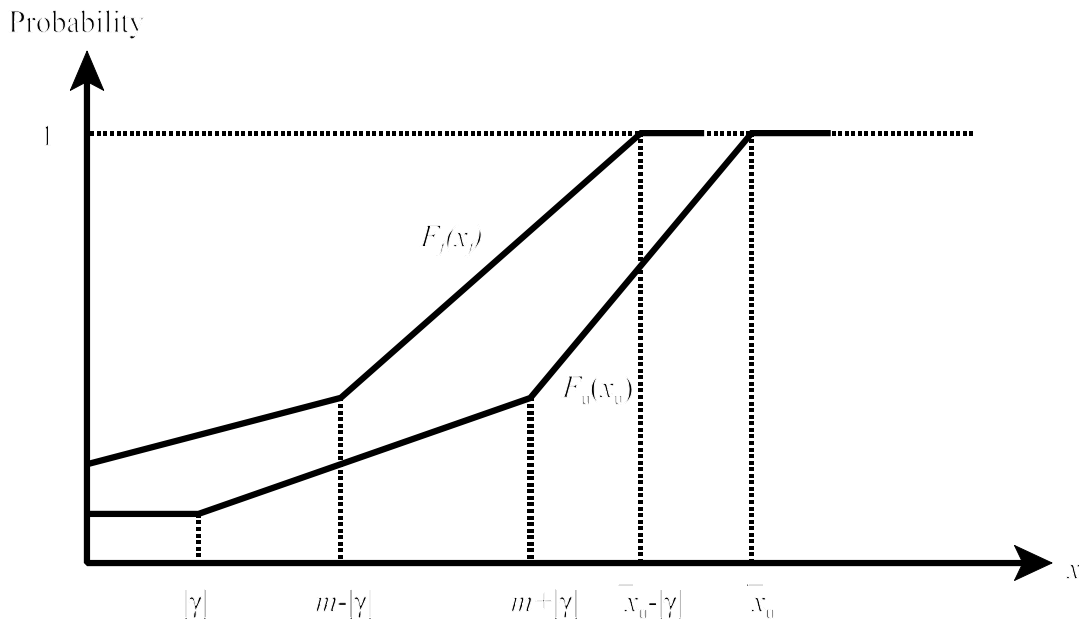
However, if the politician mildly prefers the policy position of the low-valuation lobbyist,  $\gamma \in ((v_1 - v_2)/(1+a), v_1 - v_2]$ , the identity of the advantaged lobbyist  $A$  depends on the level of the cap. Denote  $\tilde{m}$  as the level of the cap where the playing field is leveled, such that at  $\tilde{m}$  the advantage in

the competition switches from one lobbyist to the other; At  $\tilde{m}$ ,  $\bar{x}_u = \bar{x}_f + |\gamma|$ . In Lemma 7 in Appendix A  $\tilde{m}$  is shown to be

$$\tilde{m} = \frac{(1+a)(v_2 + |\gamma|) - v_1}{a} \quad (6)$$

With mild preference for the low-valuation lobbyist's policy position and  $m \leq \tilde{m}$  the playing field is tilted to the advantage of the low-valuation lobbyist since the rival lobbyist cannot make full use of his high-valuation advantage due to the restrictive nature of the cap,  $A=f$ . However when  $m > \tilde{m}$ , due to his higher valuation of the prize the unfavored lobbyist can offset the disadvantage arising from the preference of the politician since the contribution cap is not too restrictive, so  $A=u$ .

Proposition 1 contains a large number of cases subsumed in the min/max arguments in the distribution functions. In Appendix B there is a guide showing how to relate these arguments to possible ranges of  $m$ . However in order to gain some intuition about the equilibrium it is useful to consider an example. The example uses the parameter values  $\gamma \in \left( \frac{v_1 - v_2}{1+a}, v_1 - v_2 \right]$ ,  $a \in \left( \frac{v_1 - 2v_2}{v_2}, \frac{v_1 - v_2}{v_2} \right)$  and  $m \in (|\gamma|, v_1 - (1+a)|\gamma|)$ . With these parameter values the politician's preference for the policy position of the low-valuation lobbyist and the inefficiency of soft-money contributions are mild. The cap is restrictive enough so that in equilibrium both lobbyists have a positive probability of resorting



**Figure 1:** Example of equilibrium cumulative density functions

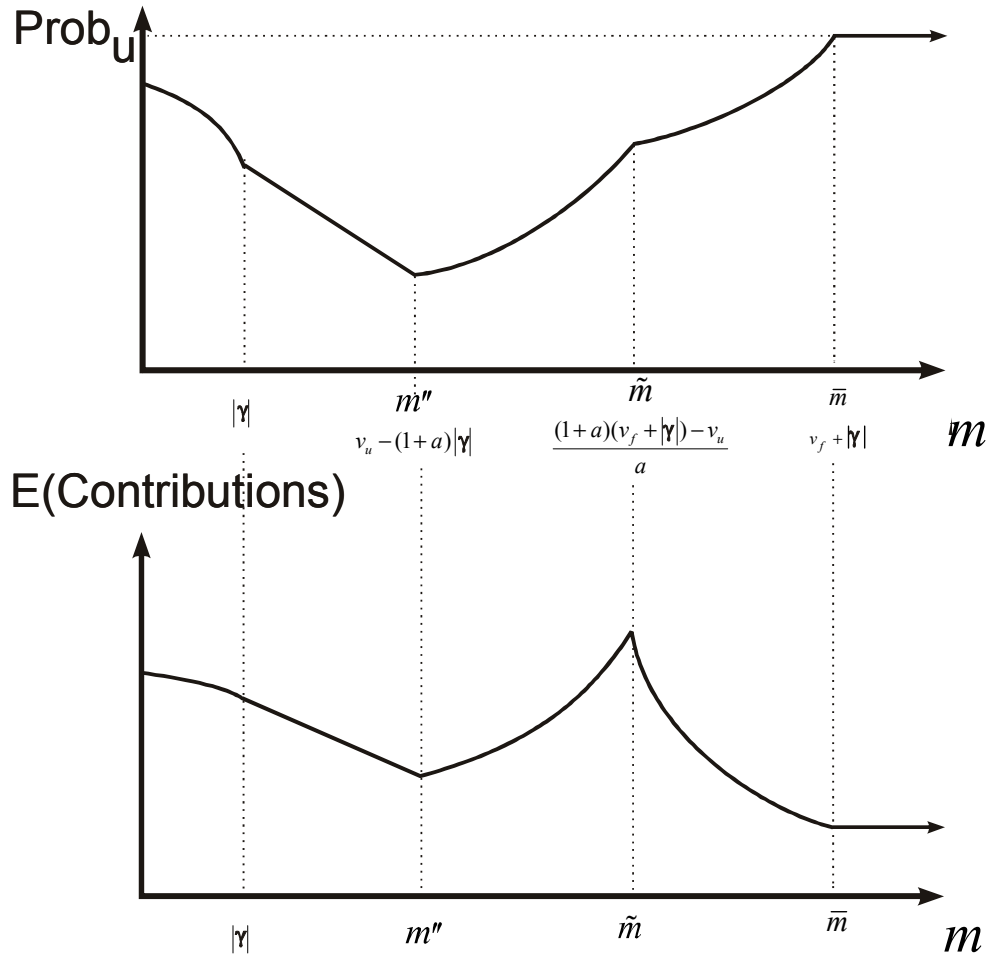
to soft money, but not so restrictive that either lobbyist does so with certainty. The favored lobbyist has the advantage in the competition, so part (i) of Proposition 1 applies,  $u=1, f=2$  and  $\bar{x}_u = \frac{v_1 + am}{1+a}$ . Figure 1 shows the equilibrium distributions.

The unfavored lobbyist must exceed his rival's contribution by the hard money equivalent of  $|\gamma|$  in order to win. Hence lobbyist  $u$  never contributes in the range  $(0, |\gamma|)$ , since he can drop his contribution to null without affecting his probability of winning. The upper bound of the equilibrium distribution of the unfavored lobbyist is  $\bar{x}_u$ . Hence lobbyist  $f$  never needs to exceed  $\bar{x}_u - |\gamma|$  since his policy position is preferred by the politician. Given the equilibrium distribution of  $f$ , lobbyist  $u$  is indifferent among all contributions in the support of his equilibrium distribution and *vice versa*. The kinks in the equilibrium distribution of each lobbyist arise from the kinks of the cost functions of the rival lobbyist. Since  $f$  has a kink in his cost function at  $m$  where the marginal cost of contributions increases to  $1+a$ ,  $u$  has a kink in his equilibrium distribution at  $m + |\gamma|$ . Likewise the kink at  $u$ 's cost function at  $m$  gives rise to a kink at  $f$ 's equilibrium distribution at  $m - |\gamma|$ . The various min/max arguments in the distribution functions in Proposition 1 are simply keeping track of the ranges where players are or are not exceeding the cap in equilibrium for all possible sets of parameter values.

Note that the model implies that empirical evidence of the effect of money on legislative action may appear to be weak for two reasons. Often competition is via soft money which is difficult to document. Furthermore, since equilibrium is in mixed strategies the unfavored lobbyist may end up contributing more than the favored lobbyist but not by enough to overcome the politician's preference. The model also suggests that the influence of money on legislative action will be strong in some policy areas but not in others since the degree of preference of the politician would vary over policy issues. Indeed in their survey of 34 empirical papers Ansolabehere *et al.* (2003) find that the effect of contributions on roll-call votes is strong in some policy areas but not in others. For instance, on issues relating to trade there is weak evidence of the effect of contributions on votes, but on issues relating to labor the evidence is very strong.

### III. Critical Levels of the Cap

From the equilibrium distribution functions it is straightforward to examine the probability that the lobbyist with the unfavored policy position wins,  $Prob_u$  and the expected total contributions,  $E(h_1+s_1+h_2+s_2)$  (see Appendix B). To illustrate the forces at work Figure 2 presents these measures as a function of the cap for the parameter values  $\gamma \in \left(\frac{v_1-v_2}{1+a}, v_1-v_2\right]$  and  $a \in \left(\frac{v_1-2v_2}{v_2}, \frac{v_1-v_2}{v_2}\right)$  where the politician's preference for the policy position of the low-valuation lobbyist and the inefficiency of soft-money contributions are mild. These ranges for  $\gamma$  and  $a$  are chosen in order to present graphs with the richest results, permitting a full discussion of the intuition for the forces at work. The general



**Figure 2:** The probability that the unfavored policy is enacted and the expected aggregate contributions for  $\gamma \in \left(\frac{v_1-v_2}{1+a}, v_1-v_2\right]$  and  $a \in \left(\frac{v_1-2v_2}{v_2}, \frac{v_1-v_2}{v_2}\right)$ . Therefore  $f=2$ ,  $u=1$ . Proposition 1(i) applies when  $m \leq \tilde{m}$ . Proposition 1(ii) applies when  $m > \tilde{m}$ .

implications of the model are presented in Section IV.

Inflection points and kinks in the graphs result from the existence (or nonexistence) of kinks in the equilibrium distribution functions. There are five critical values for the level of the cap that determine the existence of kinks in the lobbyists' equilibrium distribution functions:  $m^*, \bar{m}, m'', \tilde{m}, |\gamma|$ . The level of the cap that completely suppresses all competition,  $m^*$  is given by (5). In the range of  $\gamma$  and  $a$  for which Figure 2 is presented  $m^* < 0$ . Hence even when all hard-money contributions are banned there is still competition via soft-money donations and therefore  $Prob_u > 0$  when  $m=0$ . A barely binding cap is denoted by  $\bar{m}$ . It is equal to the maximum of the suprema of the no-cap equilibrium contribution supports of the two lobbyists.<sup>19</sup>

$$\bar{m} = \begin{cases} v_u & \text{when } \gamma \in (-v_2, 0) \cup (v_1 - v_2, v_1) \\ v_f + |\gamma| & \text{when } \gamma \in (0, v_1 - v_2] \end{cases} \quad (7)$$

When the cap is not binding ( $m > \bar{m}$ ), an increase in the cap has no effect on the equilibrium of the game and hence  $Prob_u$  and expected contributions remain constant.

As discussed above the critical level of the cap  $\tilde{m}$  is where the playing field is leveled such that  $\bar{x}_u = \bar{x}_f + |\gamma|$ .<sup>20</sup> This critical level arises only when the politician mildly prefers the policy of the low-valuation lobbyist. A level playing field induces the fiercest competition and both lobbyists are most aggressive in their contributions. Starting from  $\tilde{m}$ , relaxing the cap gives a tilt to the playing field beneficial to lobbyist 1 since with a less restrictive cap he can make better use of his advantage due to his higher valuation of the prize. This discourages the low-valuation lobbyist, which in turn leads to less effort by the high-valuation lobbyist. Hence expected contributions decrease. Likewise, starting from a level playing field at  $\tilde{m}$ , further restricting the cap leads to a playing field tilted to the advantage of the low-valuation lobbyist. This leads less intense competition and to a reduction in expected contributions.

Figure 2 shows that the probability that the politician enacts the policy that he does not favor ( $Prob_u$ ) is minimized at  $m''$ . When  $m \geq m''$  in equilibrium the favored lobbyist never contributes soft

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<sup>19</sup>The no-cap equilibrium strategies are given in Proposition 1 as  $m \rightarrow \infty$ .

<sup>20</sup>At  $\tilde{m}$  equilibrium switches from Proposition 1(i) to (ii). The value of  $\tilde{m}$  is given by (6).

money. From Proposition 1 and Lemma 5 in Appendix A, the upper bound of the equilibrium distribution function of the favored lobbyist is:

$$x_f^{\text{sup}} = \begin{cases} \bar{x}_u - |\gamma| & \text{when Proposition 1(i) applies} \\ \bar{x}_f & \text{when Proposition 1(ii) applies} \end{cases} \quad (8)$$

Solve for the lowest  $m$  where  $x_f^{\text{sup}} \leq m$  is satisfied using equation (4) and Proposition 1:

$$m'' = \begin{cases} v_u - (1+a)|\gamma| & \text{when } \gamma \in (-v_2, 0) \cup \left( \frac{v_1 - v_2}{1+a}, v_1 \right) \\ v_f & \text{when } \gamma \in \left( 0, \frac{v_1 - v_2}{1+a} \right] \end{cases} \quad (9)$$

When  $m \in (m'', \bar{m})$ , only the lobbyist with the unfavored policy position has a positive probability of exceeding the cap and contributing in soft money. In this range of  $m$ , a less restrictive cap only directly affects the unfavored lobbyist. It decreases his cost of hard money equivalent contributions, making him relatively more aggressive which leads to an increase in the probability that the unfavored lobbyist wins, as can be seen in Figure 2. When  $m \in [0, m'')$ , in equilibrium both lobbyists have a positive probability of resorting to soft-money contributions. Since the unfavored lobbyist must overcome the politician's preference in order to win, in expectation he makes more soft-money donations. So he has a higher expected cost from exceeding the hard-money cap. If the cap is relaxed, both lobbyists pay less in expected contributions since they are less likely to resort to the less efficient means of contributing (soft money). But the reduction is a larger portion of the total expected contributions for the favored lobbyist. Hence, when  $m < m''$ , an increase in  $m$  leads to a decrease in the probability that the unfavored lobbyist wins.

In addition to being a critical value for  $Prob_u$ ,  $m''$  is also a critical value for expected total contributions. Expected total contributions reach a local minimum at  $m''$ . When  $m < m''$ , with a less restrictive cap a smaller proportion of the lobbyists' donations are in the form of soft money, which leads to a decrease in total contributions. When  $m \geq m''$ , a less restrictive cap gives a favorable tilt to

the playing field for the unfavored lobbyist and this induces more aggressive contributions by the unfavored lobbyist hence the expected aggregate contributions increase.<sup>21</sup>

$m = |\gamma|$  also yields a kink in the graphs. When  $m < |\gamma|$  the lobbyist with the unfavored policy position contributes via soft money for all strictly positive contributions in the support of his equilibrium strategy. However, when  $m > |\gamma|$  this is not the case: The unfavored lobbyist has a kink in his cost function at  $m$ . This causes a kink in the equilibrium distribution function of the favored lobbyist. In Figure 2 this translates into a kink in the graphs at  $|\gamma|$ .

#### IV. Results

In this section we present two general implications of the equilibrium which provide insight into the effects of a hard-money contribution cap that can be circumvented via soft-money contributions.

**Result 1:** *The effect of a contribution cap on expected aggregate contributions:*

- (i) *A binding cap is never neutral on expected aggregate political contributions for  $\gamma \neq 0$ .*
- (ii) *When  $\gamma \in (0, v_1 - v_2]$  there exists a range of  $m$  where expected aggregate political contributions strictly increase with a more restrictive contribution cap.*

*This range is:*

- $m \in [\max(m'', |\gamma|), \bar{m})$  for  $\gamma \in \left(0, \frac{v_1 - v_2}{1 + a}\right]$
- $m \in (\max(\tilde{m}, |\gamma|), \bar{m})$  for  $\gamma \in \left(\frac{v_1 - v_2}{1 + a}, v_1 - v_2\right]$

**Proof:** Appendix B.

In KW/GC a non-rigid cap with a monetary cost of exceeding the cap is always neutral on lobbying effort and on the outcome of the competition. The cap introduces a kink in the (possibly asymmetric) cost functions of the lobbyists, but it does not change their relative strengths in the competition. So rather than thinking of the lobbyists as choosing contributions it is possible to simply think of them as choosing cost. Hence it does not change the intensity of the competition if the politician has no preference over policy alternatives.<sup>22</sup>

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<sup>21</sup>Note that when the soft money is sufficiently inefficient  $a > (v_u - |\gamma|)/|\gamma|$ ,  $m''$  is negative and  $m^*$  is positive. This implies that the favored lobbyist never exceeds the cap for these parameter values and it is only the unfavored lobbyist who is directly affected by a relaxation in the contribution cap.  $Prob_u$  then does not have a U shape as depicted in Figure 2. It is zero for all  $m \leq m^*$  and it is an increasing function of  $m$  for all  $m > m^*$ .

<sup>22</sup>CG shows that the cap can only have an effect on the competition if there are non-monetary punishments for exceeding the cap, such as jail time. In the context of soft money this issue does not arise.

However, when the politician has a policy preference a contribution cap no longer affects the two lobbyists in a symmetric fashion. The lobbyist with the disfavored policy must contribute more than the favored lobbyist in order to overcome the policy preference. In equilibrium the disfavored lobbyist resorts to the less efficient means of contributions (*i.e.*, soft-money contributions), for a greater portion of the range of his equilibrium strategy. Hence a change in the level of  $m$  alters the lobbyists' relative strength in the competition and therefore it changes the intensity of the competition.

A more restrictive cap may have the perverse effect of increasing aggregate contributions if the politician mildly prefers the policy position of the low-valuation lobbyist and the cap is not too restrictive to begin with. For the range of parameter values in Result 1 (*ii*) the politician prefers the policy position of the low-valuation lobbyist, however the preference is not strong enough to overcome lobbyist 1's advantage arising from his higher valuation. Additionally for the range of  $m$  given in Result 1(*ii*),  $m > m''$  so only the disfavored lobbyist has a positive probability of resorting to the less efficient means of contributing, resorting to soft-money contributions. Therefore decreasing  $m$  directly increases the cost of hard money equivalent contributions for the disfavored lobbyist but does not directly affect the costs of the favored lobbyist. Since the disfavored lobbyist has the advantage in the competition this results in a more level playing field and triggers more aggressive contributions by the favored lobbyist resulting in higher aggregate contributions.<sup>23</sup>

Che and Gale (1998) shows that when the cap is rigid (no soft-money loopholes), a more restrictive cap can level the playing field and induce fiercer competition leading to an increase in aggregate contributions. KW/GC however prove that not only does this result not hold if the lobbyists can contribute more than the cap but the cap never has any effect on the contributions. Result 1 (*ii*)

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<sup>23</sup>Since campaign spending closely tracks campaign contributions, see Herrnson (2000), Result 1(*ii*) implies that the relationship between contribution limits and campaign spending may be non-monotonic as in Figure 2. This may help explain the results of Gross *et al.* (2002) which show that the effect of contribution limits on total spending in gubernatorial elections is not significantly different from zero when a linear relationship is assumed. Hogan (2000) has the same implications in a study with 3,253 state legislative candidates running in 27 states in the mid 1990s. Stratmann (2006) computes an index of limits of contributions to parties, PACs, corporations, unions and individuals and finds that spending is significantly lower for state legislators from 1996 to 2000 when states have restrictions on all five sources of contributions. Also in Stratmann and Aparicio-Castillo (2006) findings indicate that stricter limits tend to be associated with lower campaign spending. However note that the data used for campaign spending in these papers do not include soft-money spending.

retrieves the original result of Che and Gale (1998) even though the cap can be circumvented via soft-money contributions when the politician has preferences over policy alternatives.<sup>24</sup>

Note that Result 1(ii) implies that contributions to a politician with a mild policy preference may increase due to a more restrictive cap, while a politician with higher  $|\gamma|$  will be faced with decreased contributions. If one interprets the politician's preference parameter  $|\gamma|$  as the expected future campaign costs required to offset the effect of taking a policy position that is not popular with his constituents, then Result 1(i) suggests that the effect of a more restrictive contribution cap on aggregate contributions may be different for house members versus senators, as well as for members from cities versus members from rural areas. Between congressional districts there are vast differences in the cost of communicating with constituents even though they represent the same number of voters.<sup>25</sup> Since a politician from a smaller or more rural district is likely to face a lower cost of communicating with constituents, with the same underlying policy preference the  $|\gamma|$  for this politician is likely to be lower. A more restrictive cap may result in reduced contributions to senators from larger states but increased contributions to representatives from districts contained within minor media markets. When states consider contribution caps for state level offices, the experience with national level contribution caps may not directly apply to state politicians who generally have much lower costs of communicating with constituents.

The introduction of politician preferences allows us to broaden the discussion of the effect of contribution caps beyond the expected level of contributions that is the focus of KW/GC. Often the amount of money in politics is used as the primary metric for the evaluation of campaign finance legislation. However the main policy concern is that contributions may change the choices that politicians make. Hence we analyze the degree of influence of money on policy: The equilibrium probability that the politician makes a policy choice that he would not have made in the absence of contributions, the probability that the disfavored policy is enacted,  $Prob_u$ . A more restrictive cap may

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<sup>24</sup>In a framework where politicians compete over contributions Chamon and Kaplan (2007) find that the lobbyist makes contributions and threatens to contribute to the rival in case of disagreement. A stricter limit weakens the threat, and hence the lobbyist increases his contribution. Drazen, Limão and Stratmann (2007) show that caps can increase the number of lobbyists and potentially increase overall contributions. In both these models contributions caps cannot be circumvented via soft-money loopholes.

<sup>25</sup>Stratmann (2009) finds that the cost of reaching 1% of congressional constituents with TV advertising during prime time in the 2000 election cycle ranged from \$18 in Idaho's 2<sup>nd</sup> district to \$1875 in New York City.

lead to increased aggregate contributions while at the same time reducing the probability that the politician enacts the unfavored policy (see Figure 2).

**Result 2:** *The effect of a contribution cap on the degree of influence of special interest money:*

*For any  $\gamma \neq 0$ ,*

*(i) Any binding cap on hard-money contributions reduces the influence of money on policy outcomes compared with unregulated contributions.*

*(ii) The influence of money on policy is minimized with a binding but strictly positive cap on hard-money contributions whenever a ban on hard-money contributions does not fully suppress all competition via soft money,  $v_u > (1+a)|\gamma|$ .*

**Proof:** Appendix B.

Result 2 is the main result of the paper. In the absence of soft-money loopholes, a complete ban on hard-money contributions would result in the politician always enacting his preferred policy. The influence of special interest money would be eliminated.  $Prob_u$  would be zero when  $m=0$ . However when there are soft-money loopholes special interest influence is not minimized with a complete ban on hard-money contributions. Figure 2 gives the probability that the unfavored policy is enacted as a function of  $m$ . While the graph is for a particular range of politician preference, as long as a complete ban on hard-money contributions does not fully suppress all competition via soft money ( $m^* < 0$ ),  $Prob_u$  has a similar U-shape. The probability that the politician goes against his policy preference is minimized at  $m''$ .<sup>26</sup>

If the cap is very restrictive ( $0 \leq m < m''$ ), in equilibrium both lobbyists have a positive probability of exceeding the cap via soft-money contributions, which are less efficient than hard-

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<sup>26</sup>Even if payoff functions were continuous a similar result would still hold: The asymmetric effects of the cap can lead to the effect of money on policy being minimized with a binding, but non-zero cap. If lobbyists had continuous concave payoff functions a pure-strategy equilibrium would be possible. In the absence of a cap both lobbyists would spend up to the point where the marginal benefit of spending was equal to the marginal cost of one. The imposition of a barely binding cap would directly effect only the lobbyist with the higher unconstrained spending. As the marginal benefit of spending is one it would not be worth exceeding the cap (at marginal cost  $1+a$ ) so he would lower his spending to  $m$ . A barely binding cap would not directly effect his rival and the indirect effect through the first lobbyist's spending is second order. Hence a barely binding cap would increase the likelihood of a policy preferred by whichever lobbyist had lower spending without a cap.

Likewise with a ban on hard-money contributions a relaxation of the cap will first directly effect the spending of whichever lobbyist has lower spending with the ban. This lobbyist's equilibrium marginal benefit of spending was  $1+a$  with the ban, but when the cap exceeds his spending with a ban the marginal cost is only 1. Hence when the cap just exceeds his former spending he will increase his spending to the level of the cap. For his rival there is no direct effect of the relaxation of the cap on his spending and the indirect effect is second order. Hence relaxing a cap from a complete ban will increase the likelihood of a policy preferred by the lobbyist with the lower spending with a ban. Therefore even with continuous payoff functions as long as the lobbyist with the preferred policy has lower equilibrium spending without cap and with a complete ban on hard-money contributions, the influence of money on policy will decrease as we move away from either unrestricted contributions or a complete ban on contributions.

money contributions. A less restrictive cap lowers both of the lobbyists' costs but the reduction in cost is proportionally larger for the favored lobbyist since the unfavored lobbyist must exceed his contribution by hard-money equivalent of  $|\gamma|$  in order to win. This leads to an increase in the probability that the lobbyist with the favored policy wins. Hence for all parameter values where  $m^* < 0$ , a complete ban on contributions leads to higher influence of money on policy compared to a strictly positive binding cap of  $m''$ . But if the cap is not very restrictive ( $\bar{m} > m > m''$ ), then only the lobbyist with the unfavored policy has a positive probability of resorting to soft-money contributions. Hence a less restrictive cap only directly reduces the cost of the unfavored lobbyist. This leads to an increase in the unfavored lobbyist's probability of winning.

The stated aim of the current legislation limiting campaign contributions is the "reduction of special interest influence." This goal may or may not be desirable, but one reasonable interpretation of it is an attempt to reduce the likelihood that the politician enacts policy against his policy preference, whether ideologically motivated or induced by his constituents. In practice however it is difficult to determine the optimal level of the cap that minimizes the influence of special interest contributions. An incumbent politician is likely to have different degrees of preference across different policy issues. The valuation of the prize to the interest groups varies depending on the policy area. Hence the legislated cap is unlikely to be able to minimize the influence of campaign contributions for all policy issues at once. However irrespective of the degree of politician preference, Result 2(i) shows that any binding contribution cap leads to a weaker influence of money on policy compared to unregulated contributions.

Furthermore for all policy issues where the preference is too strong,  $|\gamma| \geq \frac{am + v_u}{1+a}$  such that  $m \leq m^*$ , lobbyists do not contribute and the politician simply goes with his preference. Therefore a more restrictive cap implies a lower critical threshold of preference where there will be no influence of special interest groups on policy making. Hence politician decisions will be swayed by monied interests on a smaller number of questions.

## **V. Citizens United v. Federal Elections Commission**

The Bipartisan Campaign Reform Act of 2002 is a complicated set of regulations that limits hard-money contributions but also places some restrictions on soft-money that is not controlled by the candidates or political parties. It bans "electioneering communications" paid for by corporations or

labor unions from their general funds where an electioneering communication is defined as any broadcast that refers to a clearly identified candidate and is made within 30 days of a primary or 60 days of a general election.

In a five to four decision in *Citizens United v. FEC* (2010) the Supreme Court struck down the electioneering communications ban as an unconstitutional restriction of free speech. Corporations and unions can now use their general funds to finance such advertisements. Critics of the ruling have voiced their concern that it will “open the floodgates for special interests”<sup>27</sup> and reduce the quality of U.S. democracy. The dissenting opinion to the Court argues that “[a]t least in some circumstances, independent expenditures on candidate elections will raise an intolerable specter of *quid pro quo* corruption.” Upon the ruling Senator McCain simply stated that “campaign finance reform is dead.”

Prior to the *Citizens United v. FEC* ruling, corporations and unions either ran advertisements in support of a candidate very early in the election cycle – before most voters would be paying attention – or ran issue-based advertisements with the hope that voters made the connection to the particular candidate. The removal of the electioneering communications ban enhances the effectiveness of soft- money contributions – reduces the parameter  $a$  in our model. Nevertheless soft-money spending by corporations and unions is likely to still be less valuable to a politician than hard-money donations as it is not under the politician’s control. The Wall Street Journal reports in Mullins (2007) that “[b]ecause they have their own agendas, outside organizations sometimes clash with one another, the national parties, even the candidates they support.” The model implies that campaign finance reform is not dead despite the fact that soft money will now be more efficient. As long as soft-money contributions continue to be a less efficient means of currying political favor than hard-money contributions, any binding hard-money contributions cap leads to diminished influence of special interest money compared to unregulated contributions, Result 2(i).<sup>28</sup>

However, the model also implies that the current regulations on hard-money contributions may no longer be optimal. The level of the cap that minimizes special interest influence is given by

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<sup>27</sup>The quote is from President Obama’s 2010 State of the Union Address.

<sup>28</sup>This result holds as long as the politician has a preference over policy alternatives. If the politician is simply indifferent between policy alternatives, as assumed by KW/GC, then caps have no effect on the outcome of the competition regardless of the efficiency of soft money, so campaign finance reform was born dead.

$\max(0, m'')$ .  $m''$  is given by (9) and is weakly decreasing in  $a$ .<sup>29</sup> The lobbyist with the policy position that the politician prefers never resorts to soft-money contributions when the cap is at or above  $m''$ , whereas the lobbyist with the unfavored policy position contributes in soft-money in order to have a chance to overcome the politician's preference. If the cap was set at  $m''$  before the Citizens United v. FEC ruling, then with the reduction in  $a$  the ongoing cap is now too restrictive to minimize special interest influence. At the ongoing cap both lobbyists will be willing to contribute in soft money since it is now more efficient than prior to the ruling. So both lobbyists will be directly affected by the existence of the cap. Relaxing the cap so that once again only the lobbyist with the unfavored policy position resorts to the lower-powered currency can tilt the playing field in favor of the lobbyist with the policy position the politician prefers, reducing the degree of special interest influence. Of course  $v_u$  and  $\gamma$ , and hence  $m''$ , will vary over policy issues, but for each issue the special interest influence minimizing level of the cap is weakly decreasing in  $a$ . So if the level of the cap was previously set to minimize the overall degree of special interest influence, now that the Citizens United v. FEC ruling has reduced the inefficiency of soft-money spending the optimal policy response is to relax, but not eliminate, the restrictions on hard-money contributions.

A word of caution is in order in interpreting these implications. To the best of our knowledge this is the first paper that has results on the optimal hard-money contributions cap when soft money becomes more efficient. The improvement in the efficiency of soft money engendered by the Citizens United v. FEC ruling may have effects unaccounted for in this paper. To study whether campaign finance reform can achieve its stated aim of reducing special interest influence, the paper solely focuses on contributions motivated by policy favors. However, this is not the only motivation for giving. Contributions may also be made to gain access to the politician in order to present information supporting the donor's policy position. Groups may contribute to improve the electoral prospects of

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<sup>29</sup>This may not be immediately obvious as the decrease in  $a$  can switch  $m''$  between the two parts of (9). However this issue only arises for a decrease in  $a$  when  $\gamma > 0$  and initially  $\gamma > (v_1 - v_2) / (1 + a)$ . This results in  $v_f > v_u - (1 + a)|\gamma|$ , hence  $m''$  increases with the drop in  $a$ .

politicians that share their policy preference.<sup>30</sup> In these environments, there are no results in the literature so far on the effect of a contribution cap with soft-money loopholes.

## VI. Conclusion

The stated aim of the current U.S. campaign finance legislation is a reduction of special interest influence.<sup>31</sup> The previous literature on competition for political favors that allows for the possibility of exceeding the cap studies the effect of campaign finance legislation under the assumption that the politician is indifferent between policy alternatives. It focuses on aggregate contributions as an indirect measure of special interest influence. In this paper, by explicitly incorporating politician preferences we are able to capture the sense in which special interest money can overwhelm the politician's natural inclinations; the sense in which it can have an undue influence. We formalize a direct measure for the degree of influence of special interests: the equilibrium probability that the politician does not make the policy choice that he would have made in the absence of political contributions. The choice of measure matters in the evaluation of campaign finance legislation that contains soft-money loopholes. A more restrictive cap may lead to increased aggregate contributions while at the same time reducing the degree of special interest influence.

The primary contribution of the paper is to show that the effect of a contribution cap is non-monotonic on the degree of monied special interest influence when there are soft-money loopholes. As long as the incumbent politician has a preference over policy alternatives, a cap always decreases the influence of political contributions on policy outcomes compared with unregulated contributions. However a complete ban on contributions will result in a higher degree of influence of money on policy than a binding but non-zero cap.

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<sup>30</sup>In Ashworth (2006), Prat (2002) and Coate (2004a) where lobbyists contribute to buy policy favors, contribution caps may also affect information flow to the voters since contribution caps finance political advertising. In the access models of Cotton (2010), Austen-Smith (1998) and Lohmann (1995) caps affect the equilibrium information flow to the politician. In a model where donors have pure-electoral motives Coate (2004b) shows that a contribution cap has an effect on the party's choice of candidate. Cotton (2009) and Dahm and Porteiro (2008) examine caps in a model with both access and policy favor motives. Chanson and Kaplan (2007) has a combination of electoral and influence motives. All these models assume that the cap is rigid without any soft-money loopholes.

<sup>31</sup>See Title I of Public Law 107-155.

## APPENDIX A: Proof of Proposition 1

Equilibrium when  $\gamma=0$  is shown in KW. When  $\gamma \leq -v_2$ ,  $\gamma \geq v_1$  or  $m \leq m^*$  equilibrium is in pure strategies with neither lobbyist contributing and the prize being awarded to the lobbyist with the favored policy. Hence in what follows we restrict attention to  $m > m^*$  and  $\gamma \in (-v_2, 0) \cup (0, v_1)$ . Define for each lobbyist (bidder) a function  $W_i(x)$  giving the hard money equivalent contribution (bid) that he must make to effectively match a bid of  $x$  from his rival. So  $W_u(x_f) = x_f + |\gamma|$  and  $W_f(x_u) = x_u - |\gamma|$ .

**Lemma 1:** *Bidder  $u$  puts zero probability on  $x_i \in (0, |\gamma|]$ .*

**Proof:** If bidder  $u$  contemplates  $x_u \in (0, |\gamma|)$  a bid of zero wins with the same probability as he must exceed his rival's bid by at least  $|\gamma|$  in order to win. If  $x_u = |\gamma|$  then he can win only if the other bidder bids zero, in which case there is an even chance of winning. So if that bid gave him a nonnegative payoff he could double his chances of winning by a slight increase in his bid. And if it gave him a negative payoff he could get a zero payoff by dropping his bid to zero.  $\square$

**Lemma 2:** *Neither bidder puts any probability mass point on any bid greater than zero.*

**Proof:** Suppose  $u$  had a mass point at  $x_u^* \geq |\gamma|$ . Then bidder  $f$  would not put any probability at  $x_f' = x_u^* - |\gamma|$ . Either a slight increase in his bid would result in a discrete increase in the probability of winning if  $x_f' < \bar{x}_f$ , or if  $x_f' \geq \bar{x}_f$  bidder  $f$  would not put any probability at  $x_f'$ . As there is no probability of  $x_f = x_u^* - |\gamma|$ , bidder  $u$  could lower his bid slightly without changing his probability of winning. A similar argument rules out mass points for bidder  $f$  on  $x_f > 0$ .  $\square$

**Lemma 3:** *Neither bidder will use a pure strategy.*

**Proof:** Lemma 2 rules out any pure-strategy Nash equilibrium where any bid is greater than zero. Both players' bidding zero cannot be sustained as a pure-strategy equilibrium either since the best response to  $x_f=0$  would be for  $u$  to bid slightly higher than  $|\gamma|$  in which case it would be not optimal for  $f$  to bid zero.  $\square$

**Lemma 4:** *Bidder  $D$  has an infimum bid of zero. The expected value of the game to bidder  $D$  is zero.*<sup>32</sup>

**Proof:** Bidder  $D$ 's infimum bid must be less than  $v_D$  since there can be no probability mass at  $v_D$  by Lemma 2. Suppose that bidder  $D$  has an infimum bid of  $x_D^{\text{inf}} > 0$  such that  $W_A(x_D^{\text{inf}}) > 0$ . In that case bidder  $A$  would never bid  $W_A(x_D^{\text{inf}})$ . If he did he would be paying a positive amount and would lose for sure, since by Lemma 2, the probability of bidder  $D$  choosing exactly  $x_D^{\text{inf}}$  is zero in this range. Therefore bidder  $D$  could lower his infimum bid without changing the probability of winning. If bidder  $D$  is bidder  $f$ , then this implies directly that  $x_D^{\text{inf}} > 0$  is not possible since  $W_A(x_D^{\text{inf}}) = x_D^{\text{inf}} + |\gamma| > 0$ . However, if bidder  $D$  is bidder  $u$ , then  $W_A(x_D^{\text{inf}}) = x_D^{\text{inf}} - |\gamma|$ . So,  $W_A(x_D^{\text{inf}}) > 0$  for  $x_D^{\text{inf}} > |\gamma|$ .

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<sup>32</sup>Siegel (2009) could be used to directly establish the expected values. However since this game is not generic for all sets of parameter values Theorem 1 does not apply and only the weaker Corollary 2 could be used. Hence it would not be possible to establish the uniqueness of the equilibrium distribution functions using that approach.

Suppose that bidder  $D$  is bidder  $u$  and  $b_u^{\text{inf}} = |\gamma|$  where bidder  $u$  is mixing in the open interval above  $|\gamma|$  but not at  $|\gamma|$ , by Lemma 1. Then bidder  $f$  would never bid zero as this gives zero profit and he can win for sure with a bid of  $W_f(\bar{x}_u)$  yielding a positive profit. Take a bid of  $b_u = b_u^{\text{inf}} + \varepsilon = |\gamma| + \varepsilon$ , the probability that bidder  $u$  wins with this bid is  $\int_{|\gamma|}^{|\gamma| + \varepsilon} f_f(x - |\gamma|) dx$ . Since bidder  $f$  has no mass points on  $(0, \varepsilon]$  by Lemma 2, this probability is close to zero for small  $\varepsilon$ , yielding a negative expected payoff for bidder  $u$ . Hence bidder  $u$ 's infimum bid cannot be  $|\gamma|$ .  $b_u^{\text{inf}} \in (0, |\gamma|)$  is not possible by Lemma 1. Therefore a bid of zero is in the support of the mixed strategy of bidder  $u$ .

Therefore a bid of zero is in the support of the mixed strategy of bidder  $D$ . At this bid he loses for sure, so the expected value of the strategy for bidder  $D$  must be zero.  $\square$

**Lemma 5:** Bidder  $D$  has a supremum bid of  $x_D^{\text{sup}} = \bar{x}_D$ . Bidder  $A$  has a supremum bid of  $x_A^{\text{sup}} = W_A(\bar{x}_D)$ . The expected value of the game to bidder  $A$  is  $v_A - c(W_A(\bar{x}_D)) \geq 0$ , with equality only if bidder  $u$  is the advantaged bidder and  $\bar{x}_A = \bar{x}_D + |\gamma|$ .

**Proof:** Bidder  $D$  cannot have supremum bid of zero since that would be a pure strategy which contradicts Lemma 3. Suppose that bidder  $D$  has a supremum bid of  $x_D^{\text{sup}} \in (0, \bar{x}_D)$ . Then bidder  $A$  would never set  $x_A > W_A(x_D^{\text{sup}})$  as he can win for sure with  $x_A = W_A(x_D^{\text{sup}})$  since by Lemma 2 the probability of bidder  $D$  choosing exactly  $x_D^{\text{sup}}$  is zero. Therefore bidder  $D$  could win for sure with  $x_D = x_D^{\text{sup}} + \varepsilon$  yielding a payoff greater than zero for small enough  $\varepsilon$ , a contradiction of Lemma 4, and hence  $x_D^{\text{sup}} = \bar{x}_D$ .

Suppose that bidder  $A$  has a supremum bid of  $x_A^{\text{sup}} < W_A(\bar{x}_D)$ . Then bidder  $D$  could lower his supremum bid and still win for sure with that bid yielding a payoff greater than zero for small enough  $\varepsilon$ , a contradiction of Lemma 4. Bidder  $A$  can win for sure with a bid of  $W_A(\bar{x}_D)$  since by Lemma 2 the probability of bidder  $u$  choosing exactly  $\bar{x}_D$  is zero. Since  $W_A(\bar{x}_D)$  is in the support of his mixed strategy and he wins for sure with that bid, the expected payoff for bidder  $A$  is  $v_A - c(W_A(\bar{x}_D))$ .

If bidder  $f$  is the advantaged bidder  $A$ , then  $W_A(\bar{x}_D) = \bar{x}_D - |\gamma|$  and the definition of the advantaged bidder yields  $\bar{x}_A > \bar{x}_D - |\gamma|$  and so the expected payoff of bidder  $A$  is strictly positive. If bidder  $u$  is the advantaged bidder  $A$ , then  $W_A(\bar{x}_D) = \bar{x}_D + |\gamma|$  and the definition of the advantaged bidder yields  $\bar{x}_A \geq \bar{x}_D + |\gamma|$  so the expected payoff of bidder  $A$  is strictly positive unless  $\bar{x}_A = \bar{x}_D + |\gamma|$  in which case it is zero.  $\square$

**Lemma 6:** For bidder  $f$ , bids almost everywhere on  $x_f \in [0, x_f^{\text{sup}}]$  and for bidder  $u$ , bids almost everywhere on  $x_u \in (|\gamma|, x_u^{\text{sup}}]$ , must have positive probability.

**Proof:** Suppose there were an interval  $(t, s)$  in  $(|\gamma|, x_u^{\text{sup}}]$  where bidder  $u$  had zero probability of bidding. Then bidder  $f$  would have zero probability of bidding in  $(t - |\gamma|, s - |\gamma|)$  since he could lower his bid to  $t - |\gamma|$  and have the same chance of winning. But in this case bidder  $u$  would never bid  $s + \varepsilon$  as he could lower his bid to  $t$ , saving  $s + \varepsilon - t$  in bidding costs and losing only  $F_f(s + \varepsilon - |\gamma|) - F_f(t - |\gamma|)$  in probability. By Lemma 2 the loss in probability is negligible for small  $\varepsilon$ . So if there is an interval of zero probability it must go up to  $x_u^{\text{sup}}$  which contradicts Lemma 5. A symmetric argument rules out ranges of zero probability for bidder  $f$  in  $x_f \in [0, x_f^{\text{sup}}]$ .  $\square$

**Lemma 7:** If  $\gamma < 0$  or  $\gamma > v_1 - v_2$  then  $\bar{x}_u - \bar{x}_f < |\gamma|$ . If  $\gamma \in \left(0, \frac{v_1 - v_2}{1+a}\right]$  then  $\bar{x}_u - \bar{x}_f \geq |\gamma|$ . If  $\gamma \in \left(\frac{v_1 - v_2}{1+a}, v_1 - v_2\right]$  then  $\bar{x}_u - \bar{x}_f \geq |\gamma|$  when  $m \geq \tilde{m} = \frac{(1+a)(v_2 + \gamma) - v_1}{a}$  and  $\bar{x}_u - \bar{x}_f < |\gamma|$  if  $m$  is lower.

**Proof:** Consider first  $\gamma < 0$ . Then  $f$  is bidder 1 and  $u$  is bidder 2. If  $m \geq v_1$  then  $\bar{x}_1 = v_1$  and  $\bar{x}_2 = v_2$ . If  $v_2 < m < v_1$  then  $\bar{x}_1 = \frac{v_1 + am}{1+a}$  and  $\bar{x}_2 = v_2$ . If  $m \leq v_2$  then  $\bar{x}_1 = \frac{v_1 + am}{1+a}$  and  $\bar{x}_2 = \frac{v_2 + am}{1+a}$ . For all ranges of  $m$ ,  $\bar{x}_1 > \bar{x}_2$ . Hence  $\bar{x}_u - \bar{x}_f < 0 < |\gamma|$ .

Now consider  $\gamma > v_1 - v_2$ , a positive  $\gamma$  implies  $f=2$  and  $u=1$ . Hence if  $m \geq v_2$ ,  $\bar{x}_f = v_2$  and  $\bar{x}_u \leq v_1$ . So  $\bar{x}_u - \bar{x}_f \leq v_1 - v_2 < |\gamma|$ . If  $m < v_2$  then  $\bar{x}_u = \frac{v_1 + am}{1+a}$  and  $\bar{x}_f = \frac{v_2 + am}{1+a}$  so  $\bar{x}_u - \bar{x}_f = \frac{v_1 - v_2}{1+a} < v_1 - v_2 \leq |\gamma|$ .

Finally consider  $\gamma \in (0, v_1 - v_2]$ . Again  $f=2$  and  $u=1$ . Hence if  $m \geq v_1$ ,  $\bar{x}_f = v_2$  and  $\bar{x}_u = v_1$ . So  $\bar{x}_u - \bar{x}_f = v_1 - v_2 \geq |\gamma|$ . If  $m < v_2$  then  $\bar{x}_u = \frac{v_1 + am}{1+a}$  and  $\bar{x}_f = \frac{v_2 + am}{1+a}$  so  $\bar{x}_u - \bar{x}_f = \frac{v_1 - v_2}{1+a}$  which is less than  $\gamma$  if  $\gamma > \frac{v_1 - v_2}{1+a}$  and greater than or equal to  $\gamma$  otherwise. If  $m \in [v_2, v_1 - v_2]$  then  $\bar{x}_f = v_2$  and  $\bar{x}_u = \frac{v_1 + am}{1+a}$  so  $\bar{x}_u - \bar{x}_f = \frac{v_1 + am}{1+a} - v_2$ . This is less than  $\gamma$  if  $m < \frac{(1+a)(v_2 + \gamma) - v_1}{a}$  and greater than or equal to  $\gamma$  otherwise. If  $\gamma \leq \frac{v_1 - v_2}{1+a}$  then this expression does not hold for any  $m \geq v_2$  and so  $\bar{x}_u - \bar{x}_f \geq |\gamma|$ .  $\square$

**Lemma 8:** The unique equilibrium distribution functions are those given in Proposition 1.

**Proof:** Part (i): By lemma 7,  $\bar{x}_f > \bar{x}_u - |\gamma|$ . In this case the favored bidder  $f$  is also the advantaged bidder  $A$ . By lemmas 5 and 6 all bids  $x_f \in [0, W_f(\bar{x}_u)]$  must yield an expected payoff of  $v_f - c(W_f(\bar{x}_u))$  to bidder  $f$ . By lemma 2 in this range there is zero probability that  $x_u = x_f + |\gamma|$ . So bidder  $f$  wins if  $x_f \geq x_u - |\gamma|$ . Therefore on that range:

$$v_f - c(W_f(\bar{x}_u)) = v_f F_u(x + |\gamma|) - c(x)$$

So from equation 3 and the fact that  $W_f(\bar{x}_u) = \bar{x}_u - |\gamma|$ :

$$v_f - c(\bar{x}_u - |\gamma|) = \begin{cases} v_f F_u(x + |\gamma|) - x & \text{for } x \in (0, \min(m, \bar{x}_u - |\gamma|)] \\ v_f F_u(x + |\gamma|) - (1+a)x + am & \text{for } x \in (m, \bar{x}_u - |\gamma|] \end{cases}$$

letting  $x_u = x + |\gamma|$  and solving for  $F_u(\cdot)$ :

$$F_u(x_u) = \begin{cases} \frac{v_f - \bar{x}_u + x_u}{v_f} & \text{for } x_u \in (|\gamma|, \min(m + |\gamma|, \bar{x}_u)] \\ \frac{v_f - \bar{x}_u - a(m + |\gamma|) + (1+a)x_u}{v_f} & \text{for } x_u \in (m + |\gamma|, \bar{x}_u] \end{cases}$$

Bidder  $u$  places no probability on  $(0, |\gamma|]$  by lemma 1 so plugging in  $|\gamma|$  at the bottom of the range yields the probability mass at zero.

By lemmas 4, 5 and 6 all bids in  $(|\gamma|, \bar{x}_u]$  yield an expected payoff of zero to bidder  $u$ . By lemma 2 in this range there is zero probability that  $x_f = x_u - |\gamma|$  so bidder  $u$  wins if  $x_u \geq x_f + |\gamma|$ . Therefore on that range:

$$0 = v_u F_f(x - |\gamma|) - c(x)$$

So from equation 3

$$0 = \begin{cases} v_u F_f(x - |\gamma|) - x & \text{for } x \in (|\gamma|, \min(m, \bar{x}_u)) \\ v_u F_f(x - |\gamma|) - (1+a)x + am & \text{for } x \in [m, \bar{x}_u) \end{cases}$$

letting  $x_f = x - |\gamma|$  and solving for  $F_f(\cdot)$ :

$$F_f(x_f) = \begin{cases} \frac{|\gamma| + x_f}{v_u} & \text{for } x_f \in (0, \min(\max(0, m - |\gamma|), \bar{x}_u - |\gamma|)) \\ \frac{(1+a)|\gamma| - am + (1+a)x_f}{v_u} & \text{for } x_f \in [\max(0, m - |\gamma|), \bar{x}_u - |\gamma|) \end{cases}$$

plugging in zero at the bottom of the range yields the probability mass at zero.

*Part (ii):* By lemma 7,  $\bar{x}_u \geq \bar{x}_f + |\gamma|$ . In this case the unfavored bidder  $u$  is the advantaged bidder  $A$ . By lemmas 4 and 6 all bids in  $[0, \bar{x}_f]$  must yield an expected payoff of zero to bidder  $f$ . By lemma 2 in this range there is zero probability that  $x_u = x_f + |\gamma|$ . So bidder  $f$  wins if  $x_f \geq x_u - |\gamma|$ . Therefore on that range:

$$0 = v_f F_u(x + |\gamma|) - c(x)$$

So from equation 3:

$$0 = \begin{cases} v_f F_u(x + |\gamma|) - x & \text{for } x \in (0, \min(m, \bar{x}_f)] \\ v_f F_u(x + |\gamma|) - (1+a)x + am & \text{for } x \in (m, \bar{x}_f] \end{cases}$$

letting  $x_u = x + |\gamma|$  and solving for  $F_u(\cdot)$ :

$$F_u(x_u) = \begin{cases} \frac{x_u - |\gamma|}{v_f} & \text{for } x_u \in (|\gamma|, \min(m + |\gamma|, \bar{x}_f + |\gamma|)] \\ \frac{-(1+a)|\gamma| - am + (1+a)x_u}{v_f} & \text{for } x_u \in (m + |\gamma|, \bar{x}_f + |\gamma|] \end{cases}$$

Bidder  $u$  places no probability on  $(0, |\gamma|]$  by lemma 1 so plugging in  $|\gamma|$  at the bottom of the range yields the probability mass at zero.

By lemmas 4, 5 and 6 all bids in  $(|\gamma|, W_u(\bar{x}_f)]$  yield an expected payoff of  $v_u - c(W_u(\bar{x}_f))$  to bidder  $u$ . By lemma 2 in this range there is zero probability that  $x_f = x_u - |\gamma|$  so bidder  $u$  wins if  $x_u \geq x_f + |\gamma|$ . Therefore on that range:

$$v_u - c(W_u(\bar{x}_f)) = v_u F_f(x - |\gamma|) - c(x)$$

So equation 3 and the fact that  $W_u(\bar{x}_f) = \bar{x}_f + |\gamma|$  yield:

$$v_u - c(\bar{x}_f + |\gamma|) = \begin{cases} v_u F_f(x - |\gamma|) - x & \text{for } x \in (|\gamma|, \min(m, \bar{x}_f + |\gamma|)) \\ v_u F_f(x - |\gamma|) - (1+a)x + am & \text{for } x \in [m, \bar{x}_f + |\gamma|) \end{cases}$$

letting  $x_f = x - |\gamma|$  and solving for  $F(\cdot)$ :

$$F_f(x_f) = \begin{cases} \frac{v_u - c(\bar{x}_f + |\gamma|) + |\gamma| + x_f}{v_u} & \text{for } x_f \in (0, \min(m - |\gamma|, \bar{x}_f)] \\ \frac{v_u - c(\bar{x}_f + |\gamma|) - am + (1+a)(x_f + |\gamma|)}{v_u} & \text{for } x_f \in (m - |\gamma|, \bar{x}_f] \end{cases}$$

plugging in zero at the bottom of the range yields the probability mass at zero.  $\square$

**Lemma 9:** *The equilibrium distributions, and hence all comparative statics, are continuous in  $m$ .*

**Proof:** The distributions in each part of Proposition 1 are clearly continuous in  $m$ . When  $\gamma \in \left(\frac{v_1 - v_2}{1+a}, v_1 - v_2\right]$  the distribution switches from that of Proposition 1 (i) to that of Proposition 1 (ii)

at  $m = \frac{(1+a)(v_2 + \gamma) - v_1}{a}$ . However at that point the distributions are identical. If  $a \leq [v_u - |\gamma|]/|\gamma|$  then

all competition is curtailed at  $m^* = [(1+a)|\gamma| - v_u]/a$ . At that point the favored bidder is advantaged so the distribution of Proposition 1 (i) applies and it results in no competition between the bidders. The implication of Lemma 9 is that making a cap more restrictive will never result in a discontinuous jump in the expected bids as it does in Che and Gale (1998).  $\square$

This completes the proof of Proposition 1.

## APPENDIX B: Proof of Results

The results follow directly from Proposition 1. First we show how to use the relative levels of the critical values of  $m$  to determine the min and max arguments in the equilibrium distribution functions in Proposition 1. It is then straightforward to calculate  $Prob_u$  and  $E(Contributions)$  from the equilibrium distribution functions in Proposition 1:

$$Prob_u = \int_u F_f(x - |\gamma|) f_u(x) dx$$

$$E(Contributions) = \int_u x f_u(x) dx + \int_f x f_f(x) dx + \int_{\min(m, x_u^{\sup})}^{x_u^{\sup}} a(x - m) f_u(x) dx + \int_{\min(m, x_f^{\sup})}^{x_f^{\sup}} a(x - m) f_f(x) dx$$

Table 1 presents comparative statics for these measures for each of the possibilities for  $m$  relative to the critical values of  $m$  for  $m \in (\max(0, m^*), \bar{m})$ . This information is then used to prove the results.

**Table 1:** Comparative Statics when  $m \in (m^*, \bar{m})$

Proposition 1(i) applies and		$\frac{dE(Contributions)}{dm}$	$\frac{d Prob_u}{dm}$
I	$m <  \gamma $ and $m < m''$	$am \left( \frac{v_f - v_u}{v_u v_f} \right) = \begin{cases} > 0 \text{ if } f = 1 \\ < 0 \text{ if } f = 2 \end{cases}$	$\frac{-am}{v_u v_f} < 0$
II	$m <  \gamma $ and $m > m''$	$\frac{a(\bar{x}_u -  \gamma )}{v_u} + \frac{a \gamma  + a^2( \gamma  - m)}{(1+a)v_f} > 0$	$\frac{a( \gamma  + a( \gamma  - m))}{(1+a)v_u v_f} > 0$
III	$m >  \gamma $ and $m < m''$	$a \gamma  \left( \frac{v_f - v_u}{v_u v_f} \right) = \begin{cases} > 0 \text{ if } f = 1 \\ < 0 \text{ if } f = 2 \end{cases}$	$\frac{-a \gamma }{v_u v_f} < 0$
IV	$m >  \gamma $ and $m > m''$	$\frac{a(\bar{x}_u - m)}{v_u} + \frac{am}{(1+a)v_f} > 0$	$\frac{am}{(1+a)v_u v_f} > 0$
Proposition 1(ii) applies and:			
V	$m <  \gamma $ and $m < m''$	$am \left( \frac{v_f - v_u}{v_u v_f} \right) = \begin{cases} > 0 \text{ if } f = 1 \\ < 0 \text{ if } f = 2 \end{cases}$	$\frac{-am}{v_u v_f} < 0$
VI	$m <  \gamma $ and $m > m''$	$-a < 0$	0
VII	$m >  \gamma $ and $m < m''$	$a \gamma  \left( \frac{v_f - v_u}{v_u v_f} \right) = \begin{cases} > 0 \text{ if } f = 1 \\ < 0 \text{ if } f = 2 \end{cases}$	$\frac{-a \gamma }{v_u v_f} < 0$
VIII	$m >  \gamma $ and $m > m''$	$\frac{a(m - (v_f +  \gamma ))}{v_f} - \frac{a(m -  \gamma )}{v_u} < 0$	$\frac{a(m -  \gamma )}{v_u v_f} > 0$

**Determining the min max arguments in Proposition 1:**

This is considered in two parts corresponding to the two parts of Proposition 1. For all distribution functions, note that  $\max(0, m-|\gamma|)=0$  if  $m<|\gamma|$ .

i) When Proposition 1(i) applies and  $m^* < m \leq \bar{m}$  the ranges in the favored lobbyist's distribution function depend on whether or not  $m < |\gamma|$ :

$$\text{if } m \leq |\gamma|, \min(\max(0, m-|\gamma|), \bar{x}_u - |\gamma|) = 0$$

$$\text{if } m > |\gamma|, \min(\max(0, m-|\gamma|), \bar{x}_u - |\gamma|) = m - |\gamma|$$

while the ranges in the unfavored lobbyist's distribution function depend on whether or not  $m < m''$ :

$$\text{if } m \leq m'', \min(m + |\gamma|, \bar{x}_u) = m + |\gamma|$$

$$\text{if } m > m'', \min(m + |\gamma|, \bar{x}_u) = \bar{x}_u$$

When Proposition 1(i) applies,  $m'' = v_u - (1+a)|\gamma|$  and  $\bar{x}_u = (v_u + am) / (1+a) \forall m < \bar{m}$ .

(ii) When Proposition 1(ii) applies, and  $m^* < m \leq \bar{m}$  the ranges in the favored lobbyist's distribution function depend on whether or not  $m < |\gamma|$ :

$$\text{if } m \leq |\gamma|, \min(\max(0, m-|\gamma|), \bar{x}_f) = 0$$

$$\text{if } m > |\gamma|, \min(\max(0, m-|\gamma|), \bar{x}_f) = m - |\gamma|$$

while the ranges in the unfavored lobbyist's distribution function depend on whether or not  $m < m''$ :

$$\text{if } m \leq m'', \min(m + |\gamma|, \bar{x}_f + |\gamma|) = m + |\gamma|$$

$$\text{if } m > m'', \min(m + |\gamma|, \bar{x}_f + |\gamma|) = \bar{x}_f + |\gamma|$$

When Proposition 1 (ii) applies,  $m'' = v_f$  and  $\bar{x}_f = \begin{cases} v_f & \text{if } m > m'' \\ \frac{v_f + am}{1+a} & \text{if } m \leq m'' \end{cases}$

**Proof of Result 1:**

(i) From Table 1  $\forall \gamma \in (-v_2, 0) \cup (0, v_1)$  and  $m \in (\max(0, m^*), \bar{m})$  changes in  $m$  are never neutral on expected contributions.

(ii) When  $\gamma \in \left(0, \frac{v_1 - v_2}{1+a}\right]$  Proposition 1(ii) applies. It also applies when  $\gamma \in \left(\frac{v_1 - v_2}{1+a}, v_1 - v_2\right]$  and  $m > \tilde{m}$ . In this later case from (9)  $m'' = v_2$  and  $\tilde{m} > m''$  since  $\gamma > (v_1 - v_2) / (1+a)$ . So in either case  $m > \max(m'', \gamma)$  so Table 1 row VIII yields the result.  $\square$

**Proof of Result 2:** When  $v_u > (1+a)|\gamma|$  from (5)  $m^* < 0$  and from (7) and (9)  $m'' \in (0, \bar{m})$ . From Proposition 1,  $Prob_u$  is continuous in  $m$  and Table 1 shows that  $Prob_u$  is U-shaped: Decreasing in  $m$  for all  $m \in (0, m'')$  and increasing in  $m$  for all  $m \in (m'', \bar{m})$ . This completes the proof of part (ii). It also shows that whenever  $m^* < 0$  then  $Prob_u$  will be maximized at one of the endpoints, either  $m=0$  or  $m = \bar{m}$ .

If  $\gamma \in (0, (v_1 - v_2) / (1 + a)]$  then  $m^* \geq 0$  is not possible. From equations (7) and (9) whenever  $m^* \geq 0$ ,  $m'' = v_u - (1 + a)|\gamma| \leq 0$ . Hence  $m > m'' \forall m \in (m^*, \bar{m})$  and thus Table 1 shows that  $Prob_u$  is weakly increasing in  $m$  over this entire range. Moreover (7) implies that  $\bar{m} > |\gamma|$  so range VI in Table 1 (where there is no effect of changes in  $m$  on  $Prob_u$ ) must be strictly below  $\bar{m}$ . Thus if  $m^* \geq 0$  any level of cap  $m < \bar{m}$  will reduce  $Prob_u$  compared to no contribution cap.

It only remains to show that when  $m^* < 0$  the level of  $Prob_u$  is weakly lower at  $m=0$  than at  $m = \bar{m}$ . Without a cap, when  $\gamma \in (-v_2, 0) \cup (v_1 - v_2, v_1)$  then Proposition 1 part (i) applies and,

$$Prob_u = \int_u F_f(x - |\gamma|) f_u(x) dx = \frac{1}{2v_u v_f} (v_u^2 - \gamma^2) \quad (10)$$

When  $m=0$  and  $\gamma \in (-v_2, 0) \cup (\frac{v_1 - v_2}{1 + a}, v_1)$  then Proposition 1 part (i) applies and

$$Prob_u = \int_u F_f(x - |\gamma|) f_u(x) dx = \frac{1}{2v_u v_f} [v_u^2 - (1 + a)^2 \gamma^2] \quad (11)$$

which is strictly less than (10) and so part (i) holds when  $\gamma \in (-v_2, 0) \cup (v_1 - v_2, v_1)$ . When  $\gamma \in (0, v_1 - v_2]$  and there is no cap then Proposition 1 part (ii) applies and

$$Prob_u = \int_u F_f(x - |\gamma|) f_u(x) dx = 1 - \frac{v_f}{2v_u} \quad (12)$$

When  $\gamma \in (\frac{v_1 - v_2}{1 + a}, v_1 - v_2]$   $Prob_u$  is given by (11) when  $m=0$  which is strictly less than (12) for  $\gamma > (v_1 - v_2) / (1 + a)$  so part (i) holds for this range of  $\gamma$ . Finally, when  $m=0$  and  $\gamma \in (0, (v_1 - v_2) / (1 + a)]$  then Proposition 1 part (ii) applies so

$$Prob_u = \int_u F_f(x - |\gamma|) f_u(x) dx = 1 - \frac{v_f}{2v_u} \quad (13)$$

which is equal to (12) so for this final range of  $\gamma$  part (ii) holds weakly for a complete ban on contributions and holds strictly for any  $\gamma \in (0, \bar{m})$ .  $\square$

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