Strategically Uninformed Politicians and Lobbying

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Abstract

This paper develops a model of political contributions between two interest groups and a politician, in which the politician strategically chooses how informed she is about policies proposed by interest groups. The politician cares about both policy quality and political contributions. A more informed politician can better differentiate between policies, which undermines contribution competition between interest groups. By becoming more informed about policies, the politician chooses better policy but collects less contribution payments. Without contribution limits, the politician prefers to be completely uninformed about policies in order to maximize contribution payments. A contribution limit constrains the politician's ability to collect contributions and incentivizes the politician to become more informed about policies. This results in better policy outcomes and higher constituent welfare.

Keywords: lobbying, political contributions, contribution limit, constituent welfare

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1 INTRODUCTION

Campaign finance reform is a hotly debated topic in the United States. Advocates of campaign finance reform believe that campaign finance regulations prevent political contributions from buying policy favors and reduce the influence of special interests in policy-making. Opponents of campaign finance reform, however, argue that campaign finance limitations violate the First Amendment. The academic literature on campaign finance reform has not reached a consensus on the welfare effect of campaign finance reform. While some studies find that campaign contribution limits can result in better policy decisions (e.g. Prat 2002*a*,*b*, Coate 2004*a*), other papers suggest that contribution limits may harm constituent welfare (e.g. Coate 2004*b*, Drazen, Limao and Stratmann 2007).

In this paper, we consider the impact of contribution limits on how informed politicians choose to become about policies, an aspect that has been overlooked in the campaign finance literature. In the United States, public concern about policy makers' ability in making informed decisions is increasing. Anecdotal evidence suggests that policymakers sometimes do not even understand the legislation they are voting for.[1] There is also empirical evidence that politicians have misperceptions about their constituents' ideologies (Broockman and Skovronz 2013). In this paper, we build a model of political contributions between two interest groups and a politician, in which the politician strategically chooses how informed she is about policies proposed by interest groups. In the model, a politician must choose between two alternative policies, each of which is backed by an interst group. Interest groups can influence the politician's decision by making political contributions. The politician cares about both constituent welfare and political contributions, and she is uncertain about her representative constituent's valuations for both policies. The politician receives signals correlated with the representative constituent's true valuations, and strategically chooses the

[1] In 2013, after observing 14 senators take the step of recalling a bill a day after voting for it, Texas State Senator Kel Seliger said "I would be very reluctant to stand up and say that I was poorly informed and ill-prepared and clueless, which is exactly what were talking about happened here." See report by *The Texas Tribune*, available at http://www.texastribune.org/2013/05/02/do-over-votes-raise-questions/.

informativeness of the signals she receives. For example, the politician decides how many experts to consult and how much time to spend viewing policy relevant information. A more informative signal (e.g. consulting more experts, spending more time reviewing information) allows the politician to better differentiate between policies, and thus increases the likelihood that the politician chooses a better policy. However, this informational benefit comes at a cost. A more informative signal allows the politician to have better knowledge about policies, and it reduces the intensity of contribution competition between interest groups. In this way, a more informative signal reduces the contribution payments collected by the politician and thus has a negative effect on the politician's payoff. We show this negative effect dominates the informational benefit when no contribution limit is enforced, and the politician chooses a completely uninformative signal in equilibrium.

We then use this model to analyze the impact of contribution limits on constituent welfare. In this paper, we find a novel benefit of contribution limits: they encourage politicians to become more informed about policies, which leads to better policy choices and higher constituent welfare. To our knowledge, this is the first paper that identifies this benefit of contribution limits. A binding contribution limit constrains a politician's ability to extract contributions, and makes it less costly for the politician to become informed about policies. With contribution limits, choosing a completely uninformative signal is no longer optimal for the politician. This is because a moderately informative signal increases expected constituent welfare without reducing political contributions collected by the politician. In equilibrium, a politician who cares about constituent welfare would choose such a signal. With campaign contribution limits, the politician becomes more informed about policies and is able to make better policy choices. In this way, contribution limits increase constituent welfare.

The rest of the paper is organized as follows. Section 2 reviews the literature. Section 3 introduces the formal model. Section 4 solves the Perfect Bayesian Equilibrium strategies of the game descibed in Section 3. In Section 5, we first solve the Perfect Bayesian Equilibrium strategies of the game with contribution limits, and then consider the impact of contribution

limits on equilibirum behavior and constituent welfare. Section 6 considers extensions and Section 7 concludes.

2 LITERATURE REVIEW

The welfare effect of campaign finance reform has attracted a lot of attention in the literature. When analyzing how campaign finance reform affects welfare, economists and political scientists have highlighted two means by which political contributions influence the decisions of politicians. First, political contributions are provided by interest groups to influence elections. Prat (2002*a*) considers a model of electoral competition in which candidates sell policy favors to an interest group for campaign contributions. In his model, campaign contributions are used to finance campaign advertising, which signals candidate quality to voters. Since campaign advertising brings voters more information about candidate valence at the cost of a policy bias, banning contributions can increase voter welfare when the policy bias cost outweighs the informational benefit. Similar result is found in a model with multiple lobby by Prat (2002*b*). Coate (2004*a*) considers campaign advertising that is directly informative about candidate quality. He shows that when voters are fully rational, contribution limits can improve voter welfare. This is becuase contribution limits reduce the level of favors provided by qualified candidates, without reducing the probability that qualified candidates are elected. The latter is possible because campaign advertising may be more effective when voters expect less favors offered by candidates. Ashworth (2006) considers a model of electoral competition with an incumbent and shows that a ban on contribution can improve welfare when the incumbency advantage is not too large. While the above literatures find limiting or banning campaign contributions can improve voter welfare, Coate (2004*b*) shows contribution limits may reduce voter welfare. In his model, contributions are used to fund campaign advertising, which provide voters with information about candidate's ideologies. Contribution limits result in lower revenue for candidates, less advertising, and less informed voters. Anticipating this, parties are more likely to select extreme candidates and this makes

the median voter worse off.

The second strand of literature assumes that interest groups provide political contributions to influence the votes of sitting legislators. Austen-Smith (1998) shows a contribution limit causes the politician to grant access to a more-informative interest group rather than a group with a higher willingness to pay for access. Cotton (2009) develops a model of political contributions in which a politician can either sell favors or sell access. He shows that a contribution limit makes it more likely for the politician to sell access rather than to sell favors, which allows the politician to be more informed and choose better policy. In this way, contribution limits improve expected constituent welfare. Cotton (2012) develops an informational lobbying model in which the politician can require contributions for access and finds contribution limits can encourage the formation of lobby groups. This results in more information disclosure, a better-informed politician, and better policy choices. Other papers, however, suggest that contribution limits may harm constituent welfare. In Riezman and Wilson (1997), a politician may sell additional policy favors when facing a contribution limit, because the politician wants to compensate for lost revenue due to the limit. Drazen, Limao and Stratmann (2007) shows a contribution limit can result in the formation of more lobbying groups, and worse policy outcomes for constituents. Dahm and Porteiro (2008) develops a lobbying model in which interest groups can influence the politician through political contributions and informational lobbying. They show that a contribution limit may deter informational lobbying and results in a less informed politician.

Our analysis is closely related to the second strand of literature in that we focus on an incumbent politician. We develop a lobbying model between two interest groups and a sitting politician who strategically decides how informed she is about policies proposed by interest groups. We then use this model to analyze the welfare effect of contribution limits. We find that the politician has greater incentive to be informed about policies with the presence of contribution limits. Since a more informed politician chooses better policy, contribution limits result in better policy outcome and higher constituent welfare. To our knowledge, this

benefit of contribution limits is first identified in our paper and represents contribution to the campaign finance literature.

In our model, we show the politician faces a trade off between policy relevant information and political contributions. By becoming more informed about policies, the politician reduces the intensity of contribution competition between interest groups. This has a similar flavor to results found in other literatures. Moscarini and Ottaviani (2001) shows more product information reduces the intensity of price competition between firms. Boleslavsky and Cotton (2014) shows a more informative campaign undermines policy competition.

3 MODEL

A politician (she) must choose between two alternative policies, which are backed by interest group L and R respectively. The policy proposed by interest group $i \in \{L, R\}$ gives the politician's representative constituent payoff q_i.[2] The analysis assumes that the politician's policy utility is equivalent to the payoff function for her representative constituent. The politician experiences policy utility $W(q_i)$ when choosing interest group i's policy, where

$$W(q_i) = q_i.$$

The politician is uncertain about her representative constituent's payoff from each policy (i.e. they are uncertain about q_i). This is because politicians often have to make decisions on many issues, some of which they know little or nothing about. It is common knowledge that q_i is the independent realization of a Normally distributed random variable: $q_i \sim N(\mu, 1)$. Interest groups engage in informational lobbying and provide policy relevant information to the politician. This helps the politician to assess how each policy impacts constituent welfare. To model this process, we assume that the politician observes a signal about q_i. This signal is denoted by s_i and it is drawn from a Normal distribution centered around q_i.

[2]The representative constituent is a non-player in the game.

Specifically, s_i is the realization of a random variable $S_i \sim N(q_i, \sigma^2)$. The higher is σ, the less informative is the signal about q_i; $\sigma \to \infty$ represents a perfectly uninformative signal which does not alter the politician posterior beliefs about q_i. We define $\gamma \equiv \sqrt{\frac{2}{1+\sigma^2}}$ as the informativeness of the signal. A higher γ corresponds to a lower σ and thus represents a more informative signal. The politician can increase the informativeness of the signal by hiring more experts to evaluate policies and by devoting more time reviewing policy relevant information. Increasing the informativeness of the signal, however, is costly to the politician. This is because hiring experts is often expensive and the opportunity cost of time is usually high for politicians. We assume the politician must pay $k\gamma^2$, where $k > 0$, to receive a signal with informativeness level γ. In Section 6, we show all of our results continue to hold when it is costless for the politician to become informed about policies (i.e. $k = 0$). This is the case when the politician is an expert in the field or when the politician has sufficient time reviewing policy relevant information.

Both interest groups can influence the politician's decision by making campaign contributions. These contributions are monetary payments from interest groups to the politician, and they are contingent on the decision of the politician, meaning interest group i delivers the promised contribution only if its policy is chosen by the politician.[3]

The politician wants to increase her representative constituent's welfare. She also cares about the contributions she collects from interest groups. Following Bennedsen and Feldmann (2006) and Dahm and Porteiro (2008), we assume the utility of contributions to the politician is additively separable and linear, with a (marginal) value of campaign contributions equal to α. After observing $S_i = s_i$, the politician's expected payoff from choosing interest group i's policy is

$$U_d = E(W(q_i)|S_i = s_i) + \alpha c_i = E(q_i|S_i = s_i) + \alpha c_i.$$

Both interest groups have additively separable preference in the utility from winning the

[3]This assumption is consistent with the common agency model. See Bernheim and Whinston (1986)

competition and the contributions paid to the politician. Interest group i receives payoff $u_i = v - c_i$ when its own policy is chosen by the politician. The value v represents how much interest groups care about policy relative to money. Interest groups share a common v, which is common knowledge. When its proposal is not chosen by the politician, interest group i receives payoff $u_i = 0$.

The timing of the game is as follows.

1. In the first stage, the politician strategically chooses the informativeness of the signal she receives (i.e. she chooses γ) and makes it public to interest groups.

2. In the second stage, interest groups observe the politician's choice of γ and then simlutanesouly make campaign contribution offers to the politician (i.e. they choose c_i). When contribution offers are made, interest groups commit to pay the promised offer when their policies are chosen.

3. In the third stage, the politician decides which policy to choose after observing contribution offers from interest groups (i.e. c_i) and signal realizations for each policy (i.e. s_i).

The game described above is a dynamic game of incomplete but symmetric information. Therefore, Perfect Bayesian Equilibria is the appropriate solution concept for this game. Since no information asymmetry exists, no signalling takes place in this game. In the next section, we solve the Perfect Bayesian Equilibrium strategies of the game described above.

4 BENCHMARK CASE: NO CONTRIBUTION LIMIT

In this section, we solve the Perfect Bayesian Equilibrium strategies of the game described in Section 3. In this game, interest groups can make any contribution offer to the politician. We first derive the probability that each policy is chosen and interest groups's choice of contribution offers. Then we consider the politican's choice of the informativeness of the signal.

After observing signal realization $S_i = s_i$, the politician updates her belief about q_i. Given that $q_i \sim N(\mu, 1)$ and $S_i|q_i \sim N(q_i, \sigma^2)$, the politician's posterior belief regarding q_i given a particular signal realization s_i is

$$q_i|S_i = s_i \sim N(\frac{s_i + \mu\sigma^2}{1+\sigma^2}, \frac{\sigma^2}{1+\sigma^2}).$$

Therefore, the politician's expected policy utility given signal realization s_i is the mean of this distribution

$$E(q_i|S_i = s_i) = \frac{s_i + \mu\sigma^2}{1+\sigma^2}.$$

The politician chooses interest group L's policy when

$$E(q_L|S_L = s_L) + \alpha c_L > E(q_R|S_R = s_R) + \alpha c_R.$$

This is equivalent to

$$\frac{s_L + \mu\sigma^2}{1+\sigma^2} - \frac{s_R + \mu\sigma^2}{1+\sigma^2} > \alpha(c_R - c_L). \tag{1}$$

The left hand side represents the difference in expected policy utility. A positive value means that interest group L's policy gives the politician and her representative constituent higher payoff than the policy proposed by interest group R. The right hand side represents differences in contribution offers, and positive values mean interest group R offers more to the politician than interest group L. For group L to win, the policy benefit it is expected to provide must dominate any contribution disadvantage. Given that the signals regarding q_i are stochastic, neither group can choose contribution offers to guarantee that inequality (1) holds or fails to hold. Therefore, the probability group L's policy is chosen equals the probability inequality (1) is satisfied given (c_L, c_R).

Given that $q_i \sim N(\mu, 1)$ and $S_i|q_i \sim N(q_i, \sigma^2)$, we have $S_i \sim N(\mu, 1+\sigma^2)$. This implies

that

$$\frac{s_i + \mu\sigma^2}{1+\sigma^2} \sim N(\mu, \frac{1}{1+\sigma^2}),$$

and

$$\frac{s_1 + \mu\sigma^2}{1+\sigma^2} - \frac{s_2 + \mu\sigma^2}{1+\sigma^2} \sim N(0, \gamma^2),$$

where $\gamma = \sqrt{\frac{2}{1+\sigma^2}}$ and it represents the informativeness of the signal the politician chooses.

This further implies that interest group L's policy is chosen with probability

$$\Phi(\frac{\alpha(c_L - c_R)}{\gamma}),$$

where function $\Phi(\cdot)$ represents the cumulative distribution function of the standard Normal random variable $N(0,1)$.

Interest group $i \in \{L, R\}$ chooses their contribution offers c_i, knowing its choice of c_i affects the probability its policy is chosen. Interest group i receives payoff $u_i = v - c_i$ when its own policy is chosen by the politician, and receives payoff $u_i = 0$ otherwise. Therefore, the expected payoff of interest group L is

$$E(u_L|c_L, c_R) = \Phi(\frac{\alpha(c_L - c_R)}{\gamma})(v - c_L).$$

Interest group L chooses c_L to maximize its expected payoff. The first order condition is

$$-\Phi(\frac{\alpha(c_L - c_R)}{\gamma}) + \frac{\alpha}{\gamma}\phi(\frac{\alpha(c_L - c_R)}{\gamma})(v - c_L) = 0,$$

where function $\phi(\cdot)$ represents the probability density function of the standard Normal random variable $N(0,1)$.

Rearranging the above equation, we have

$$\frac{\alpha}{\gamma}\phi(\frac{\alpha(c_L - c_R)}{\gamma})(v - c_L) = \Phi(\frac{\alpha(c_L - c_R)}{\gamma}). \tag{2}$$

Similarly, we can show the following is true for interest group R

$$\frac{\alpha}{\gamma}\phi(\frac{\alpha(c_R - c_L)}{\gamma})(v - c_R) = \Phi(\frac{\alpha(c_R - c_L)}{\gamma}). \tag{3}$$

Combining equations (2) and (3), we have

$$(v - c_L)\Phi(\frac{\alpha(c_R - c_L)}{\gamma}) = (v - c_R)\Phi(\frac{\alpha(c_L - c_R)}{\gamma}). \tag{4}$$

The solution to this equation is given by the following lemma.

Lemma 4.1 *The only solution to equation (4) is* $c_L = c_R$.

When $c_L = c_R$, the first order condition for interest group L becomes

$$\frac{\alpha}{\gamma}\phi(0)(v - c_L) = \Phi(0).$$

Solving the above equation, we have interest group L's equilibrium choice of contribution

$$c_L = v - \frac{\sqrt{2\pi}}{2\alpha}\gamma.$$

Similarly, we can show interest group R's equilibrium choice of contribution

$$c_R = v - \frac{\sqrt{2\pi}}{2\alpha}\gamma.$$

It is straightforward to show interest groups' choice of contribution is increasing in α, the weight the politician puts on contributions in her utility function. When a politician cares more about political contributions, interest groups respond by contributing more. It is also easy to show that equilibrium contribution offers made by interest groups are decreasing in γ, the informativeness of signals the politician receives. Receiving more informative signals allows the politician to better differentiate between policies, which reduces the intensity of

contribution competition between interest groups. Interest groups respond by contributing less to more informative signals. As a result, the politician receives less contributions when she chooses a more informative signal. This result is summarized as follows.

Lemma 4.2 *Without contribution limit, contributions made by interest groups are decreasing in γ, the informativeness of the signals the politician receives. A more informative signal has a negative effect on contributions received by the politician.*

In the first stage, the politician chooses the informativeness of the signal she receives. We use q_s to denote the politician's policy utility from the selected policy. Given signal realization s_L and s_R, we have

$$q_s|s_L, s_R = max\{\frac{s_L + \mu\sigma^2}{1+\sigma^2}, \frac{s_R + \mu\sigma^2}{1+\sigma^2}\}.$$

We have shown that $\frac{s_i+\mu\sigma^2}{1+\sigma^2}$ is distributed according to $N(\mu, \frac{1}{1+\sigma^2})$. Therefore, the politician's expected policy utility is

$$E(q_s) = E[max\{Q_1, Q_2\}],$$

where $Q_i \sim N(\mu, \frac{1}{1+\sigma^2})$.

Using a standard formula, this expectation evaluates to

$$E(q_s) = \mu + \frac{1}{\sqrt{2\pi}}\gamma,$$

where $\gamma = \sqrt{\frac{2}{1+\sigma^2}}$ and it represents the informativeness of the signal chosen by the politician.

It follows directly from the above equation that the politician's expected policy utility is increasing in the informativeness of the signal (i.e. γ). When signals become more informative, the politician is better able to distinguish between different policies, and expects higher policy utility from a more informative signal.

Lemma 4.3 *Without contribution limit, the politician's expected policy utility is increasing in γ, the informativeness of signals the politician receives. A more informative signal has a positive effect on the politician's expected policy utility.*

A more informative signal allows the politician to better distinguish between policies and thus increases the politician's expected policy utility. As shown by Lemma 1, a more informative signal also reduces the politician's payoff by lowering campaign contribution offers made by interest groups. Therefore, the politician faces a tradeoff between campaign contributions and expected policy utility. As we have shown, the politician anticipates to receive contribution offers $c_L = c_R = v - \frac{\sqrt{2\pi}}{2\alpha}\gamma$ in equilibrium. Therefore, by setting the informativeness of the signal to γ, the politician expects the following payoff

$$E(U_P) = \mu + \frac{1}{\sqrt{2\pi}}\gamma + \alpha(v - \frac{\sqrt{2\pi}}{2\alpha}\gamma) - k\gamma^2.$$

This expression simplifies to

$$E(U_P) = \mu + \alpha v + \frac{1-\pi}{\sqrt{2\pi}}\gamma - k\gamma^2.$$

The derivative of $E(U_P)$ with respective to γ equals

$$\frac{\partial E(U_P)}{\partial \gamma} = \frac{1-\pi}{\sqrt{2\pi}} - 2k\gamma,$$

which is negative for all $\gamma \geq 0$. Therefore, the politician prefers to choose a completely uninformative signal $\gamma^* = 0$ in equilibrium. This is because the negative effect of a more informative signal on campaign contributions outweighs its positive effect on the politician's expected policy utility. When $\gamma^* = 0$, interest groups choose contribution offers $c_L^* = c_R^* = v$ in equilibrium. This result is summarized by the following proposition.

Proposition 4.4 *Without contribution limit, the politician chooses a completely uninformative signal $\gamma^* = 0$ in equilibrium and interest groups make contribution offers $c_L^* = c_R^* = v$.*

While a more informative signal increases the politician's policy utility, it reduces campaign contributions received by the politician. Therefore, the politician faces a tradeoff between policy outcomes and campaign contributions. In equilibrium, the politician chooses a completely uninformative signal becuase the negative effect of a more informative signal on campaign contributions dominates its positive effect on policy utility. When the politician chooses a completely uninformative signal, contribution competition between interest groups is most fierce. Interest groups provide the highest possible contribution offers and the politician receives the highest possible rent from interest groups. Given the equilibrium behavior of the politician and interest groups, we can derive the politician's expected policy utility. Since the politician's policy utility is equivalent to the welfare function for her representative constituent, we also have the expected constituent welfare. It is given by the following Corollary.

Corollary 4.5 *Without contribution limit, the representative constituent's expected welfare is* μ.

5 CONTRIBUTION LIMIT

In this section, we consider the impact of a contribution limit on equilibrium behavior and constituent welfare. Because interest groups would never contribute more than v, a limit greater than v has no impact on equilirium behavior. Such a "non-binding" limit is not interesting. In this paper, we focus on a limit that is strictly less than v, denoted by $\bar{c} \in [0, v)$. Interest groups cannot contribute more than the limit.

5.1 GAME WITH CONTRIBUTION LIMIT

In Section 3, we show that both interest groups make contribution offers $c_L = c_R = v - \frac{\sqrt{2\pi}}{2\alpha}\gamma$ when there is no contribution limit. With a binding contribution limit, we can show that

interest groups contribute $c_L = c_R = v - \frac{\sqrt{2\pi}}{2\alpha}\gamma$ when

$$v - \frac{\sqrt{2\pi}}{2\alpha}\gamma \leq \bar{c} \Leftrightarrow \gamma \geq \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}},$$

and contribute $c_L = c_R = \bar{c}$ when

$$v - \frac{\sqrt{2\pi}}{2\alpha}\gamma > \bar{c} \Leftrightarrow \gamma < \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}.$$

A contribution limit constrains the politician's ability to extract rent from interest groups. With contribution limit, a moderately informative signal increases the politician's expected policy utility without impeding her ability to collect contributions. Therefore, the politician has an incentive to increase the informativeness of the signal she receives and never chooses a completely uninformative signal. The politician's choice of signal is related to the level of the contribution limit. When the contribution limit is strict, the politician chooses a relatively informative signal in equilibrium. When the contribution limit is moderate, however, the politician chooses a relatively uninformative signal in equilibrium. The following proposition gives a detailed description of the Perfect Bayesian Equilibrium strategies of the game with contribution limit.

Proposition 5.1 *In the game with contribution limit,*

1. *For any $\bar{c} < v - \frac{1}{4\alpha k}$, the politician chooses a signal with informativeness $\gamma = \frac{1}{2\sqrt{2\pi}k} > 0$, and interest groups offer to contribute $c_L = c_R = \bar{c}$.*

2. *For any $v - \frac{1}{4\alpha k} \leq \bar{c} < v$, the politician chooses a signal with informativeness $\gamma = \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}} > 0$, and interest groups make contribution offers $c_L = c_R = \bar{c}$.*

Given the equilibrium strategies of the politician and interest groups, we can calculate the politician's expected policy utility (i.e. the representative constituent's expected welfare). It is given by the following Corollary.

Corollary 5.2 *In the game with contribution limit,*

1. *For any* $\bar{c} < v - \frac{1}{4\alpha k}$*, the expected constituent welfare is* $\mu + \frac{1}{4\pi k}$*.*

2. *For any* $v - \frac{1}{4\alpha k} \leq \bar{c} < v$*, the expected constituent welfare is* $\mu + \frac{\alpha(v-\bar{c})}{\pi}$*.*

5.2 EFFECT OF LIMIT ON CONSTITUENT WELFARE

A contribution limit causes the politician to choose a more informative signal, which allows the politician to better distinguish between policies. This tends to increase the politician's expected policy utility and her representative constituent's welfare. As shown in Corollary 5.2, expected constituent welfare in the game with contribution limit is either $\mu + \frac{1}{4\pi k}$ or $\mu + \frac{2\alpha(v-\bar{c})}{2\pi}$. Both of them are greater than μ, the expected constituent welfare in the game without contribution limit. This result is summarized by the following Theorem.

Theorem 5.3 *A contribution limit increases the expected constituent welfare.*

Without contribution limits, the politician perfers to be uninformed about policies in order to maximize contribution payments. A contribution limit constrains the politician's ability to collect contributions and reduces the opportunity cost of choosing a more informative signal. This incentivizes the politician to become more informed about the policy, which leads to better policy choices and higher constituent welfare.

6 ALTERNATIVE ASSUMPTIONS

In this section, we consider extentions of the initial analysis.

6.1 COSTLESS SIGNALS

In the initial analysis, we assume that it is costly for the politician to acquire a more informed signal regarding policy quality. This assumption is consistent with the fact that politicians often have to hire experts to evaluate policy relevant information. Even if the politician is an

expert in the field, devoting time to review such information is also costly to the politician. However, it is important to note that this cost is not necessary to derive our results.

In the Appendix, we consider the case when it is costless for the politician to acquire a more informative signal. In this case, a more informative signal allows the politician to be more informed about policy and makes better policy decision, but it also reduces political contributions received by the politician. Since the latter effect dominates the former effect, the politician chooses a completely uninformative signal in equilibrium. When a contribution limit is enforced, the politician's ability to collect political contributions is constrained. This reduces the cost of choosing a more informative signal and incentivizes the politician to become more informed about the policy, which leads to better policy choice and higher constituent welfare.

7 CONCLUSION

In this paper, we develop a lobbying model to analyze an incumbent politician's decision on how informed to become about alternative policies. Using this model, we identify a novel mechanism through which contribution limits improve constituent welfare: contribution limits incentivize politicians to become more informed about policies and lead to better policy outcomes. In our analysis, we show the politician faces a trade-off between policy relevant information and political contributions. Without contribution limits, the politician prefers to be uninformed about policies in order to collect more political contributions. A contribution limit constrains the politician's ability to collect contributions and makes it more attractive for the politician to be informed about policies. As a result, the politician chooses to become more informed with the presence of a contribution limit. This leads to better policy outcomes and higher constituent welfare.

The US Supreme Court's decision in *Citizens United v. Federal Election Commission* eliminates the previous ban on corporations and unions using their own money to support political campaigns. Although the ruling does not affect campaign contribution limits, it

allows the formation of super PACs which can accept unlimited contributions from individuals, corporations and unions. Interest groups can now make unlimited contributions to a politician's super PAC rather than the politician herself. In this sense, the Citizens United ruling is equivalent to a removel of campaign contribution limits. Our analysis suggests that this ruling may harm constituent welfare by incentivizing politicians to become less informed about policies.

It is important to note that there are other benefits and disadvantages of contribution limits that we do not address in our paper. Contribution limits may reduce the funds available for campaign advertising and result in less-informed voters, more extreme candiates and less welfare (Coate 2004*b*). In this paper, we focus on an incumbent politician and abstract away from elections. Future work may incorporate our model to an election game or empirically test the implications of our results.

8 APPENDIX

8.1 PROOF OF LEMMA 4.1

First note that interest group i would never choose $c_L > v$. Suppose $c_L < c_R \leq v$ satisfies this equation. Then we have $\Phi(\frac{\alpha(c_R - c_L)}{\gamma}) > \frac{1}{2} > \Phi(\frac{\alpha(c_L - c_R)}{\gamma}) > 0$ and $v - c_L > v - c_R \geq 0$. This implies that $(v - c_L)\Phi(\frac{\alpha(c_R - c_L)}{\gamma}) > (v - c_R)\Phi(\frac{\alpha(c_L - c_R)}{\gamma})$. A contradiction. Similarly, we can show $c_R < c_L \leq v$ is not a solution to this equation. Therefore, the only possible solution to this equation is $c_L = c_R$. When $c_L = c_R$, the left hand side of equation (4) becomes $\frac{1}{2}(v - c_L)$ and the right hand side of equation (4) becomes $\frac{1}{2}(v - c_R)$. They are equal since $c_L = c_R$. Therefore, $c_L = c_R$ is a solution to equation (4).

8.2 PROOF OF LEMMA 4.2

In the body of the paper, we have established that interest group i's equilibrium choice of contribution given γ equals

$$c_i = v - \frac{\sqrt{2\pi}}{2\alpha}\gamma$$

The derivative of c_i with respect to γ is

$$\frac{\partial c_i}{\partial \gamma} = -\frac{\sqrt{2\pi}}{2\alpha} < 0.$$

Therefore, contributions made by interest groups in equilibrium are decreasing in γ, the informativeness of the signals the politician receives. A more informative signal has a negative effect on political contributions received by the politician.

8.3 PROOF OF LEMMA 4.3

In the body of the paper, we have established that the politician's expected policy utility given γ is

$$E(q_s|\gamma) = \mu + \frac{1}{\sqrt{2\pi}}\gamma.$$

The derivative of $E(q_s)$ with respect to γ is

$$\frac{\partial E(q_s)}{\partial \gamma} = \frac{1}{\sqrt{2\pi}}\gamma > 0.$$

Therefore, the politician's expected policy utility is increasing in γ, the informativeness of signals the politician receives. A more informative signal has a positive effect on the politician's expected policy utility.

8.4 PROOF OF PROPOSITION 4.4

The proof follows immediately from the analysis in Section 4.

8.5 PROOF OF COROLLARY 4.5

In the body of the paper, we have established that the politician's expected policy utility given γ is

$$E(q_s|\gamma) = \mu + \frac{1}{\sqrt{2\pi}}\gamma.$$

This is also the representative constituent's expected welfare. From Proposition 4.4, the politician chooses $\gamma = 0$ in equilibrium. Therefore, the politician's expected policy utility in equilibrium equals μ, and the representative constituent expects welfare μ in equilibrium.

8.6 PROOF OF PROPOSITION 5.1

The proof is divided into two cases, based on the value of the contribution limit.

Case I: $\bar{c} < v - \frac{1}{4\alpha k}$. Suppose first that the politician chooses a relatively informative signal (i.e. $\gamma \geq \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$). In this case, interest groups make contribution offers $c_L = c_R = v - \frac{\sqrt{2\pi}}{2\alpha}\gamma$ in the second stage. The politician's expected payoff from choosing $\gamma \geq \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$ is

$$E(U_P) = \mu + \alpha v + \frac{1-\pi}{\sqrt{2\pi}}\gamma - k\gamma^2.$$

The derivative of $E(U_P)$ with respective to γ equals $\frac{1-\pi}{\sqrt{2\pi}} - 2k\gamma$, which is negative. This means the politician's expected payoff is decreasing in γ. As a result, the politician in equilibrium chooses the lowest possible $\gamma = \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$. The politician's expected payoff from such a signal is

$$E(U_P) = \mu + \alpha v + \frac{\alpha(v-\bar{c})[(1-\pi) - 2\alpha k(v-\bar{c})]}{\pi}.$$

Suppose instead that the politician chooses a relatively uninformative signal (i.e. $\gamma < \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$). When γ falls into this range, interest groups contribute $c_L = c_R = \bar{c}$ in the second stage. The politician's expected payoff from choosing $\gamma < \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$ is

$$E(U_P) = \mu + \frac{1}{\sqrt{2\pi}}\gamma + \alpha\bar{c} - k\gamma^2.$$

The first order condition is

$$\frac{1}{\sqrt{2\pi}} - 2k\gamma = 0 \Leftrightarrow \gamma = \frac{1}{2\sqrt{2\pi}k}.$$

The politician's expected payoff is achieved at $\gamma = \frac{1}{2\sqrt{2\pi}k}$ since $\bar{c} < v - \frac{1}{4\alpha k}$ guarantees that

$$\frac{1}{2\sqrt{2\pi}k} < \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}.$$

The politician's expected payoff from choosing $\gamma = \frac{1}{2\sqrt{2\pi}k}$ is

$$E(U_P) = \mu + \frac{1}{4\pi k} + \alpha\bar{c} - \frac{1}{8\pi k}.$$

It is straightforward to show that when $\bar{c} < v - \frac{1}{4\alpha k}$ the politician receives higher expected payoff from $\gamma = \frac{1}{2\sqrt{2\pi}k}$ than from $\gamma = \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$. In this case, the politician chooses a signal with informativeness $\gamma^* = \frac{1}{2\sqrt{2\pi}k} > 0$ in the first stage, and interest groups make contribution offers $c_L^* = c_R^* = \bar{c}$ in the second stage.

Case II: $\bar{c} \geq v - \frac{1}{4\alpha k}$**.** Suppose that the politician chooses a relatively informative signal

(i.e. $\gamma \geq \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$). In this case, interest groups make contribution offers $c_L = c_R = v - \frac{\sqrt{2\pi}}{2\alpha}\gamma$ in the second stage. The politician's expected payoff from choosing $\gamma \geq \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$ is

$$E(U_P) = \mu + \alpha v + \frac{1-\pi}{\sqrt{2\pi}}\gamma - k\gamma^2.$$

The derivative of $E(U_P)$ with respective to γ equals $\frac{1-\pi}{\sqrt{2\pi}} - 2k\gamma$, which is negative. This means the politician's expected payoff is decreasing in γ. As a result, the politician chooses $\gamma = \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$, the lowest possible γ, in equilibrium. The politician's expected payoff from choosing such a signal is

$$E(U_p) = \mu + \alpha v + \frac{\alpha(v-\bar{c})[(1-\pi) - 2\alpha k(v-\bar{c})]}{\pi}.$$

Next, suppose the politician chooses a relatively uninformative signal $\gamma < \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$ in the second stage. In this case, interest groups offer $c_L = c_R = \bar{c}$ in the second stage. The politician's expected payoff from choosing $\gamma < \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$ is

$$E(U_P) = \mu + \frac{1}{\sqrt{2\pi}}\gamma + \alpha\bar{c} - k\gamma^2.$$

The first order condition is

$$\frac{1}{\sqrt{2\pi}} - 2k\gamma = 0 \Leftrightarrow \gamma = \frac{1}{2\sqrt{2\pi}k}.$$

In this case, the politician's expected payoff is maximized at γ that is marginally lower than $\frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$. This is because $\bar{c} \geq v - \frac{1}{4\alpha k}$ implies that

$$\frac{1}{2\sqrt{2\pi}k} \geq \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}.$$

The politician's expected payoff from such a signal is thus marginally lower than

$$E(U_p) = \mu + \alpha v + \frac{\alpha(v-\bar{c})[(1-\pi) - 2\alpha k(v-\bar{c})]}{\pi},$$

the politician's expected payoff from choosing $\gamma = \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$.

Therefore, in the case when $\bar{c} \geq v - \frac{1}{4\alpha k}$, the politician prefers to choose a signal with informativeness $\gamma = \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}} > 0$, and interest groups make contribution offers $c_L = c_R = \bar{c}$ in equilibrium.

8.7 PROOF OF COROLLARY 5.2

The proof follows immediately from the proof of Proposition 5.1.

8.8 THEOREM 5.3

The proof follows immediately from the analysis in Section 5.

8.9 COSTLESS SIGNALS

When it is costless for the politician to choose a more informative signal, the analysis in the body of the paper is unchanged up until we get the politician's expected payoff given γ. When signals are costless, the politician's expected payoff is

$$E(U_P) = \mu + \alpha v + \frac{1-\pi}{\sqrt{2\pi}}\gamma.$$

The derivative of $E(U_P)$ with respective to γ equals

$$\frac{\partial E(U_P)}{\partial \gamma} = \frac{1-\pi}{\sqrt{2\pi}},$$

which is negative regardless of γ. Therefore, the politician prefers to choose a completely uninformative signal $\gamma^* = 0$ in equilibrium.

Next, we consider contribution limits. In the body of the paper, we have established that when facing a binding contribution limit, interest groups contribute $c_L = c_R = v - \frac{\sqrt{2\pi}}{2\alpha}\gamma$ when

$$v - \frac{\sqrt{2\pi}}{2\alpha}\gamma \leq \bar{c} \Leftrightarrow \gamma \geq \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}},$$

and contribute $c_L = c_R = \bar{c}$ when

$$v - \frac{\sqrt{2\pi}}{2\alpha}\gamma > \bar{c} \Leftrightarrow \gamma < \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}.$$

This is still true when it is costless for the politician to choose a more informative signal. Suppose first that the politician chooses a relatively informative signal (i.e. $\gamma \geq \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$). In this case, interest groups make contribution offers $c_L = c_R = v - \frac{\sqrt{2\pi}}{2\alpha}\gamma$ in the second stage. The politician's expected payoff from choosing $\gamma \geq \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$ is

$$E(U_P) = \mu + \alpha v + \frac{1-\pi}{\sqrt{2\pi}}\gamma.$$

The derivative of $E(U_P)$ with respective to γ equals $\frac{1-\pi}{\sqrt{2\pi}}$, which is negative. This means the politician's expected payoff is decreasing in γ. As a result, the politician in equilibrium chooses the lowest possible $\gamma = \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$. The politician's expected payoff from such a signal is

$$E(U_P) = \mu + \alpha v + \frac{\alpha(v-\bar{c})(1-\pi)}{\pi}.$$

Suppose instead that the politician chooses a relatively uninformative signal (i.e. $\gamma < \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$). When γ falls into this range, interest groups contribute $c_L = c_R = \bar{c}$ in the second stage. The politician's expected payoff from choosing $\gamma < \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$ is

$$E(U_P) = \mu + \frac{1}{\sqrt{2\pi}}\gamma + \alpha\bar{c}.$$

The derivative of $E(U_P)$ with respective to γ equals $\frac{1}{\sqrt{2\pi}}$, which is positive. This means

the politician's expected payoff is increasing in γ. As a result, the politician in equilibrium chooses the highest possible γ, which is marginally lower than $\frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$. The politician's expected payoff from choosing such a signal is marginally lower than

$$E(U_P) = \mu + \frac{\alpha(v-\bar{c})}{\pi} + \alpha\bar{c},$$

which is lower than the politician's expected payoff from $\gamma = \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}}$.

Therefore, with a contribution limit, the politician chooses a signal with informativeness $\gamma^* = \frac{2\alpha(v-\bar{c})}{\sqrt{2\pi}} > 0$ in equilibirum. Compared with the case when there is no contribution limit, where the politician chooses a completely uninformative signal (i.e. $\gamma = 0$), a contribution limit makes the politician to choose a more informative signal.

REFERENCES

Ashworth, Scott. 2006. "Campaign finance and voter welfare with entrenched incumbents." *American Political Science Review*, 100: 55–68.

Austen-Smith, David. 1998. "Allocating access for information and contributions." *Journal of Law, Economics and Organization*, 14(2): 277–303.

Bennedsen, Morten, and Sven E. Feldmann. 2006. "Informational Lobbying and Political Contributions." *Journal of Public Economics*, 90: 631–656.

Bernheim, B. Douglas, and Michael D. Whinston. 1986. "Menu auctions, resource allocation, and economic influence." *Quarterly Journal of Economics*, 101(1): 1–32.

Boleslavsky, Raphael, and Christopher Cotton. 2014. "Information and Extremism in Elections." *American Economic Journal: Microeconomics*, forthcoming.

Broockman, David E., and Christopher Skovronz. 2013. "What Politicians Believe About Their Constituents: Asymmetric Misperceptions and Prospects for Constituency Control." Working paper.

Coate, Stephen. 2004*a*. "Pareto improving campaign finance policy." *American Economic Review*, 94(3): 628–655.

Coate, Stephen. 2004*b*. "Political competition with campaign contributions and informative advertising." *Journal of the European Economic Association*, 2(5): 772–804.

Cotton, Christopher. 2009. "Should we tax or cap political contributions? A lobbying model with policy favors and access." *Journal of Public Economics*, 93: 831–842.

Cotton, Christopher. 2012. "Pay-to-play politics: Informational lobbying and contribution limits when money buys access." *Journal of Public Economics*, 96: 369–386.

Dahm, Matthias, and Nicolas Porteiro. 2008. "Side-Effects of Campaign Finance Reform." *Journal of the European Economic Association*, 6: 1057–1077.

Drazen, Allan, Nuno Limao, and Thomas Stratmann. 2007. "Political contribution caps and lobby formation: theory and evidence." *Journal of Public Economics*, 91(723-751).

Moscarini, Giuseppi, and Marco Ottaviani. 2001. "Price competition for an informed buyer." *Journal of Economic Theory*, 101: 457–493.

Prat, Andrea. 2002*a*. "Campaign advertising and voter welfare." *Review of Economic Studies*, 69(4): 997–1017.

Prat, Andrea. 2002*b*. "Campaign spending with office-seeking politicians, rational voters and multiple lobbies." *Journal of Economic Theory*, 103: 162–189.

Riezman, Raymond, and John Douglas Wilson. 1997. "Political reform and trade policy." *Journal of International Economics*, 42(67-90).