B Supplemental Appendix: Online

B.1 Corner Solution: Direct Lobbying Only

Suppose $\frac{\partial \Pi^p}{\partial \tilde{a}^{lp}} < \frac{\partial \Pi^p}{\partial c^p}\Big|_{A^p=c^p}$ for the policymaker's problem described in (2.17). All political access is allocated by each policymaker to citizen-donors and there is no access for commercial lobbyists.

Equilibrium The full symmetric steady state equilibrium for this corner solution is characterized by the following equilibrium conditions as well as the population constraint, adding-up conditions, access rules, and a formal description of the asset value equations incorporating the lobbyists' choices.

$$\text{Market for Political Access:} \qquad A_t = \bar{P}A^p, c_t^p = A_t^p, \text{ and } \tilde{a}_t^{lp} = 0. \tag{B.1}$$

$$\text{Lobbying Labor Market:} \qquad \text{not existent because of } \tilde{a}_t^{lp} = l_t^p = 0. \tag{B.2}$$

$$\text{Market for Lobbying Services:} \qquad \text{not existent because of } \tilde{a}_t^{lp} = l_t^p = 0. \tag{B.3}$$

The equilibrium conditions imply that all endogenous variables describing the outcomes in the lobbying labor market and market for lobbying services are equal to zero and only the market for political access is existent.

Focusing on the market for political access and updating the population constraint, $T = C_t + L_t + \bar{P}$, we have

$$T = C_t^{-d} + C_t^d + \bar{P}, \tag{B.4}$$

where $C^* = C^{-d*} + C^{d*} = T - \bar{P}$ and $L^* = 0$, and using (B.1), we have $C^{d*} = \bar{P}c^p = \bar{P}A^p$, which implies $C^{-d*} = T - \bar{P}(1 + A^p)$. The values for $\{C^*, C^{-d*}, C^{d*}, L^*\}$ describe the identity of agents.

Focusing on the financial contribution values and citizens' payoffs, we can apply Lemma 1 and the citizen-donors' stationary participation constraint. The stationary citizen-donor payoff is

$$V^{cd} = \frac{1+r}{r}\left(\pi^c - \bar{f}^{cp}\right) \tag{B.5}$$

such that $V^{cd} - V^c$ can be written as $\frac{1+r}{r}\left(\pi^c - \bar{f}^{cp}\right) - V^c$. Applying $\bar{f}_t^{cp} = \frac{V^{cd}-V^c}{1+r}$, we have

$$\frac{1+r}{r}\left(\pi^c - \bar{f}^{cp}\right) - V^c = (1+r)\bar{f}^{cp}. \tag{B.6}$$

Because of no entry into the political access market, we can apply $V^c = 0$. This implies

$$\bar{f}^{c*} = f^{c*} = \frac{\pi^c}{1+r} > 0 \tag{B.7}$$

and expected private steady state payoffs of

$$V^{c*} = 0 \text{ and } V^{cd*} = (1+r)\bar{f}^{c*} = \pi^c > 0 \tag{B.8}$$

for citizens and citizen-donors. The values for $\{\bar{f}^{c*}, f^{c*}, V^{c*}, V^{cd*}\}$ together with $\{C^*, C^{-d*}, C^{d*}, L^*\}$ describe the full symmetric steady state equilibrium here.

B.2 Corner Solution: Specialization in Lobbying with Contributions and Information

Suppose $\frac{\partial \Pi^p}{\partial \tilde{a}^{lp}} = \frac{\partial \Pi^p}{\partial c^p}\Big|_{A^p = c^p + l^p \tilde{a}^{lp}}$, $\frac{\partial \Pi^p}{\partial \bar{q}^{lp}}\Big|_{\bar{q}^{lp}>0} = 0$, and $\frac{\partial \Pi^p}{\partial \bar{f}^{lp}}\Big|_{\bar{f}^{lp}=0} \leq 0$ for the policymaker's problem described in (2.17). All political access is allocated by each policymaker to citizen-donors and commercial lobbyists but there is no expectation for contributions by commercial lobbyists.

Equilibrium The full symmetric steady state equilibrium for this corner solution is characterized by the following equilibrium conditions as well as the population constraint, adding-up conditions, access rules, and a formal description of the asset value equations incorporating the lobbyists' choices.

$$\text{Market for Political Access:} \quad A_t = \bar{P}A^p, A_t^p = c_t^p + l_t^p \tilde{a}_t^{lp}, c_t^p > 0, l_t^p > 0, \text{ and } \tilde{a}_t^{lp} > 0. \tag{B.9}$$

$$\text{Lobbying Labor Market:} \quad e_t(C_t + D_t L_t) = D_t L_t. \tag{B.10}$$

$$\text{Market for Lobbying Services:} \quad G'(n_t^l) = k_t = \frac{\tilde{a}_t^{lp}}{n_t^l}\pi^c \text{ for all } l \text{ and } t. \tag{B.11}$$

The equilibrium conditions imply that there is no demand for contributions by commercial lobbyists and lobbyists to exhibit a maximum of verification efforts – i.e., $\bar{f}^{l*} = f^{l*} = 0$.

The remainder of the symmetric steady state equilibrium is described by the following simultaneous equations without a recursive structure. The equilibrium conditions describing the agents' identity follow from the population constraint and symmetry for citizen-donors, lobbyists, and citizen-clients:

$$T = \bar{P} + C^d + C^{-d} + L, \tag{B.12}$$

$$C^d = c^p \bar{P}, \tag{B.13}$$

$$L = l^p \bar{P} \tag{B.14}$$

$$\text{and } C^{-d} = n^l L. \tag{B.15}$$

The symmetric equilibrium conditions for the political access market follow from (2.2) and (2.10):

$$\frac{\tilde{a}^{lp}}{n^l}\pi^c = k \tag{B.16}$$

$$\text{and } k = G'\left(n^l\right). \tag{B.17}$$

The lobbying labor market clears if

$$e = \frac{DL}{C^d + C^d + n^l L}. \tag{B.18}$$

The symmetric equilibrium conditions for the political access market follow the interior distribution of access, each lobbyist's presentation portfolio constraint, each lobbyist' client portfolio constraint, each lobbyists' incentive compatibility constraints, and each lobbyist's and citizen-donor's contribution constraint:

$$A^p = c^p + l^p \tilde{a}^{lp}, \tag{B.19}$$

$$\tilde{a}^{lp} = \rho(x^+) m^{lp} + u^{lp}, \tag{B.20}$$

$$n^l = m^{lp} + u^{lp} + d^{lp}, \tag{B.21}$$

$$\frac{-\epsilon}{\sigma^2}\frac{\phi}{\tilde{a}^{lp}} = \frac{w(\epsilon^*)}{r+D}, \tag{B.22}$$

$$H'\left(m^{lp}\right) + H''(m^{lp})\frac{r+D}{w\left(\epsilon^*\right)} = \frac{1}{\alpha}\frac{s}{T}\rho(x^+)\left[\rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)\right]\frac{\phi}{\tilde{a}^{lp}}, \tag{B.23}$$

$$\alpha \bar{f}^c - B'\left(c^p + l^p\right) = \frac{s}{T}\rho(x^+)\left[\rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)\right]\frac{\partial m^*}{\partial \tilde{a}^{lp}}, \tag{B.24}$$

$$\bar{f}^{cp} = f^{cp} = \frac{V^{cd} - V^c}{1+r}. \tag{B.25}$$

The symmetric equilibrium payoffs for lobbyists, citizen-clients, and citizen-donors are:

$$V^l = \left(\frac{1+r}{r}\right)\left(\frac{r+e}{1-e}\right)\frac{H'(m^{lp})}{h^*} > 0, \tag{B.26}$$

$$V^c = \frac{(1+r)e}{r+e}V^l > 0, \tag{B.27}$$

$$V^{cd} = \pi^c + \frac{V^c}{1+r} > 0. \tag{B.28}$$

B.3 Corner Solution: Specialization in Lobbying with Contributions

Suppose $\frac{\partial \Pi^p}{\partial \tilde{a}^{lp}} = \frac{\partial \Pi^p}{\partial c^p}\Big|_{A^p = c^p + l^p \tilde{a}^{lp}}$, $\frac{\partial \Pi^p}{\partial \bar{q}^{lp}}\Big|_{\bar{q}^{lp}=0} \leq 0$, and $\frac{\partial \Pi^p}{\partial \bar{f}^{lp}}\Big|_{\bar{f}^{lp}>0} \geq 0$ for the policymaker's problem described in (2.17). All political access is allocated by each policymaker to citizen-donors and commercial lobbyists but there is no expectation for verification effort.

Equilibrium The full symmetric steady state equilibrium for this corner solution is characterized by the following equilibrium conditions as well as the population constraint, adding-up conditions, access rules, and a formal description of the asset value equations incorporating the lobbyists' choices.

$$\text{Market for Political Access:} \quad A_t = \bar{P}A^p, A_t^p = c_t^p + l_t^p \tilde{a}_t^{lp}, c_t^p > 0, l_t^p > 0, \text{ and } \tilde{a}_t^{lp} > 0 \tag{B.29}$$

$$\text{Lobbying Labor Market:} \quad L_t > 0 \text{ but } e_t = 0. \tag{B.30}$$

$$\text{Market for Lobbying Services:} \quad G'(n_t^l) = k_t = \frac{\tilde{a}_t^{lp}}{n_t^l}\pi^c \text{ for all } l \text{ and } t. \tag{B.31}$$

The equilibrium conditions imply that there is no demand for verification efforts, no entry into the lobbying industry, and no positive rents for citizen-clients – i.e., $\bar{q}^* = m^* = D^* = e^* = V^{c*} = 0$.

The remaining endogenous variables are explained is described by the following simultaneous equations without a recursive structure. The equilibrium conditions describing the agents' identity follow from the population constraint and symmetry for citizen-donors, lobbyists, and citizen-clients:

$$T = \bar{P} + C^d + C^{-d} + L, \tag{B.32}$$

$$C^d = c^p \bar{P}, \tag{B.33}$$

$$L = l^p \bar{P} \tag{B.34}$$

$$\text{and } C^{-d} = n^l L. \tag{B.35}$$

The symmetric equilibrium conditions for the political access market follow from (2.2) and (2.10):

$$\frac{\tilde{a}^{lp}}{n^l}\pi^c = k \tag{B.36}$$

$$\text{and } k = G'\left(n^l\right). \tag{B.37}$$

There is no lobbying labor market, and the symmetric equilibrium conditions for the political access market follow each lobbyist's presentation portfolio constraint, each lobbyist' client portfolio constraint, each lobbyists' incentive compatibility constraints with m^*, and each lobbyist's and citizen-donor's contribution constraint:

$$A^p = c^p + l^p\tilde{a}^{lp}, \tag{B.38}$$

$$\tilde{a}^{lp} = u^{lp}, \tag{B.39}$$

$$n^l = u^{lp} + d^{lp}, \tag{B.40}$$

$$\alpha\frac{\pi^c}{1+r} = B'\left(c^p + l^p\right), \tag{B.41}$$

$$\bar{f}^{l*} = f^{l*} = \frac{kn^l - G(n^l)}{1+r}, \tag{B.42}$$

$$\bar{f}^{c*} = f^{c*} = \frac{V^{cd} - V^c}{1+r} = \frac{\pi^c}{1+r}. \tag{B.43}$$

The symmetric equilibrium payoffs for lobbyists, citizen-clients, and citizen-donors are:

$$V^{l*} = \frac{(1+r)(r+e^*)}{r(1-e^*)}\frac{H'(m^*)}{\frac{\phi}{\tilde{a}^*}w(\epsilon^*)}, \tag{B.44}$$

$$V^{c*} = \frac{(1+r)e^*}{r+e^*}V^{l*} > 0, \tag{B.45}$$

$$V^{cd} = \pi^c + \frac{V^{c*}}{1+r} > 0. \tag{B.46}$$

B.4 Corner Solution: Commercial Lobbying with Verification Efforts

Suppose $\frac{\partial\Pi^p}{\partial\tilde{a}^{lp}} > \frac{\partial\Pi^p}{\partial c^p}\Big|_{\sum_{l=1}^{l^p}\tilde{a}^{lp}=A^p}$ for the policymaker's problem described in (2.17). All political access is allocated by each policymaker to commercial lobbyists and there is no access for citizen-donors.

Equilibrium The full symmetric steady state equilibrium for this corner solution is characterized by the following equilibrium conditions as well as the population constraint, adding-up conditions, access rules, and a formal description of the asset value equations incorporating the lobbyists' choices.

$$\text{Market for Political Access:} \quad A_t = \bar{P}A^p, c_t^p = 0, \text{ and } \sum_{l=1}^{l^p}\tilde{a}_t^{lp} = A^p. \tag{B.47}$$

$$\text{Lobbying Labor Market:} \quad e_t(C_t + D_tL_t) = D_tL_t. \tag{B.48}$$

$$\text{Market for Lobbying Services:} \quad G'(n_t^l) = k_t = \frac{\tilde{a}_t^{lp}}{n_t^l}\pi^c \text{ for all } l \text{ and } t. \tag{B.49}$$

The equilibrium conditions imply that all endogenous variables describing citizen-donors and their potential activities are zero – i.e., $C^{d*} = \bar{f}^{c*} = f^{c*} = V^{cd*} = 0$ and $C^{-d*} = C^*$.

In a corner solution to the policymaker's optimization described in (2.17) with only verification effort by commercial lobbyists, each policymaker sets $\tilde{a}^{cp} = 0$ such that $c^p = 0$ and $\bar{f}^{lp} = 0$ to extract lobbyists' available resources via verification efforts by adjusting the information quality threshold. Note that a lobbyist who would make a positive financial contribution would be dropped as a contribution would reduce resources for verification. So a lobbyist's best-response is $f^{l*} = 0$. The first-order condition for the quality threshold is

$$\frac{\partial \Pi^p}{\partial \bar{q}^{lp}} = \frac{\rho(x^+)s}{\alpha T}\left[\rho(s^+|x^+) - \rho(s^-|x^+) - \rho(s^+) + \rho(s^-)\right]\frac{\partial m^*}{\bar{q}^{lp}}, \tag{B.50}$$

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

$$\frac{-\epsilon}{\sigma^2}\frac{\phi}{\tilde{a}} = \frac{w(\epsilon^*)}{r+D}. \tag{B.51}$$

It follows that a policymaker chooses $\bar{q}^{lp}$ to solve (B.51). Again, at low levels of $\bar{q}^{lp}$ an increase in this minimum quality requirement increases verification, whereas for $\bar{q}^{lp}$ sufficiently high an increase in this minimum quality requirement decreases verification. It follows that (B.51) displays a global maximum. Using (B.51) and the lobbyist's stationary first-order condition from (A.27), the corresponding m^* solves

$$H\left(m^l\right) + H'\left(m^l\right)\frac{r+D}{\frac{\phi}{\tilde{a}}w(\epsilon^*)} = kn^l - G\left(n^l\right) - \frac{rV^c}{1+r} \tag{B.52}$$

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

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

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

$$L_t = \frac{T-\bar{P}}{1+n_t^l}. \tag{B.53}$$

From the equilibrium condition in the political access market, (B.47), and the equilibrium in the lobbying service market, (B.49), we have

$$\frac{\bar{P}A^p}{L_t n_t^l}\pi^c = G'\left(n_t^l\right) \text{ for every } l \text{ and } t. \tag{B.54}$$

Using (B.53) and (B.54), the implicit solution for the equilibrium number of clients per firm follows from

$$\frac{n^*}{1+n^*}G'\left(n_t^l\right)\Big|_{n^l=n^*} = \frac{\bar{P}A^p\pi^c}{T-\bar{P}}, \tag{B.55}$$

where the equilibrium number of clients is positive and unique.[79] The equilibrium numbers of lobbyists

[79]See Groll and Ellis (2014).

and citizens are then

$$L^* = \frac{T - \bar{P}}{1 + n^*} \text{ and } C^* = L^* n^* \tag{B.56}$$

and the equilibrium lobbying service fee is

$$k^* = G'\left(n_t^l\right)\Big|_{n^l = n^*}. \tag{B.57}$$

The market clearing lobbying service fee thus depends on the number of clients, lobbyists' political access, the private benefit of an enacted policy proposal, and the cost of organizing proposals. The values of k^*, n^*, L^*, and C^* describe the equilibrium in the lobbying service market.

Continuing with the market on which lobbyists and policymakers trade for political access and applying (B.47), each lobbying firm receives political access of

$$\tilde{a}^* = \frac{\bar{P} A^p}{L^*} \tag{B.58}$$

in exchange for their lobbying efforts. Each policymaker sets $\bar{f}^{lp} = 0$ and maximizes the resources available for verification efforts. Lobbyists make no financial contributions, $\bar{f}^{l*} = f^{l*} = 0$, because it would signal a waste of resources. The equilibrium quality threshold and verification effort follow (B.51) and (B.52) for a given V^c. The steady state entry into the lobbying industry follows from B.48 and B.56 such that $e = \frac{D}{n+D}$.

The value asset equation for a citizen follows from (B.48) and it holds that there is a private rent dissipation for citizens in the current period as characterized by (B.54) and (B.57) – i.e., $\Pi_t^c = 0$. Hence, we have

$$V^c = \frac{(1+r)e}{r+e} V^l. \tag{B.59}$$

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

$$V^l = \frac{(1+r)\left(kn - G\left(n\right) - H\left(m^{lp}\right)\right)}{r+D} + \frac{D}{r+D} V^c. \tag{B.60}$$

Using (B.59) and (B.60), we get

$$V^l = \frac{(1+r)\left(kn^l - G\left(n^l\right) - H\left(m^{lp}\right)\right)(r+e^*)}{r\left(r+e+D(1-e)\right)}. \tag{B.61}$$

Using (B.52) and (B.59), we have

$$H\left(m^l\right) + H'\left(m^l\right)\frac{r+D}{\frac{\phi}{\tilde{a}} w(\epsilon^*)} = kn^l - G\left(n^l\right) - \frac{re}{r+e} V^l \tag{B.62}$$

Using $e = \frac{D}{n^*+D}$, (B.61), and (B.62), we can write

$$H'\left(m^{lp}\right)\frac{1}{\frac{\phi}{\tilde{a}} w(\epsilon^*)} = \left(kn^* - G\left(n^*\right) - H\left(m^{lp}\right)\right)\frac{n^*}{r(n^*+D) + D(1+n^*)} \tag{B.63}$$

which solves with (B.51) and $\tilde{a}^*$ for $\{\bar{q}^*, m^*\}$ that is unique as shown. The pair $\{\bar{q}^*, m^*\}$ solve for D^*, which solves for e^*. The expected lifetime payoff for a lobbyist in steady state is then

$$V^{l*} = \frac{(1+r)(r+e^*)}{r(1-e^*)} \frac{H'(m^*)}{\frac{\phi}{\tilde{a}^*} w(\epsilon^*)} \tag{B.64}$$

and for a citizen

$$V^{c*} = \frac{(1+r)e^*}{r+e^*} V^{l*} > 0. \tag{B.65}$$

Finally, $u^* = \tilde{a}^* - \rho(x^+)m^*$ and $d^* = n^* - m^* - u^*$.