Special Interest Politics: Contribution Schedules versus Nash Bargaining

Achim Voss* and Mark Schopf†

May 2016

Abstract The article compares two models of lobby influence on policy choice: The Grossman & Helpman (1994) contribution-schedule model and a negotiation between the lobbies and the government summarized by a Nash-bargaining function. The literature uses the models interchangeably because they imply the same equilibrium policy. We derive under which conditions they lead to the same payments, equilibrium utilities, and total efficiency. They coincide under particular assumptions about bargaining power and disagreement utility.

Keywords Nash Bargaining · Common-Agency Model · Lobbying

JEL Classification C71 · C78 · D72

*School of Economics and Social Sciences, University of Hamburg, Von-Melle-Park 5, 20146 Hamburg, Germany. Tel.: +49 40 42838 4529. E-mail: achim.voss@wiso.uni-hamburg.de.

†Faculty of Business Administration and Economics, University of Paderborn, Warburger Str. 100, 33098 Paderborn, Germany. Tel.: +49 5251 60 2848. E-mail: mark.schopf@upb.de.

1 Introduction

The political common-agency model of Grossman & Helpman (1994) is the workhorse model of a large literature on the influence of special-interest groups. It assumes that the government would like to maximize welfare, but it is willing to deviate from this aim if it receives *contribution payments* as a compensation. Its counterparts are the organized special-interest groups or *lobbies*. Before the government chooses policy, they simultaneously confront it with *contribution schedules* defining payments as functions of the policy. The government then chooses policy taking these schedules into account.

The basic contribution-schedules model assumes that all agents have constant marginal utility of money. Equilibrium policy then maximizes a weighted sum of welfare and profits of all sectors with lobbies. This would also be the outcome of an alternative policy process: Nash bargaining between the government and the lobbies. While Grossman & Helpman (2001, 247) dismiss the possibility of bargaining with all lobbies because "the policymaker would not wish to be seen as openly peddling her influence", some authors use the multilateral Nash-bargaining model, stating that the two models of political interaction are equivalent – see for instance Dharmapala (1999), Gawande et al. (2009), Goldberg & Maggi (1999) and Maggi & Rodríguez-Clare (2000). These papers focus on the choice of policy, however, while not analyzing the equilibrium contribution payments.

The contribution of the present chapter is to compare the two models' equilibrium properties with respect to payments, utilities and efficiency. A clear understanding of the differences between multilateral bargaining and the common-agency setting is relevant for three reasons. Firstly, to verify the claim of a part of the literature that they are equivalent. Secondly, there are situations that may be described by both models, though not necessarily in domestic politics. For example, different organizations from industrial countries may simultaneously try to influence the policy in a developing country, a question we address in Schopf & Voss (2016). Thirdly, the models have implications for the interest groups preferences for allowing more or less efficient policy; determining whether these implications are the same in both models is important for analyzing the choice of institutions and constitutions.

The following Section 2.1 introduces the agents, Sections 2.2 and 2.3 analyze the policy-choice mechanisms, and Section 2.4 discusses different assumptions for behavior in case of disagreement. Section 3 compares the models and concludes.

2 The Models

2.1 The Agents

Lobbies influence policy by paying contributions to a government. Denoting the policy vector by $\mathbf{p} = \{p_k\}_{k \in K}$, the utility of lobby $i \in L$ is a linear combination of its gross utility $W_i(\mathbf{p})$ and a cost of paying contributions c_i:

$$V_i = W_i(\mathbf{p}) - b_i c_i \qquad b_i \geq 0. \tag{1a}$$

Similarly, the government's utility G depends on welfare $W(\mathbf{p})$ and contribution payments $\mathbf{c} = \{c_i\}_{i \in L}$:

$$G = W(\mathbf{p}) + \sum_{i \in L} a_i c_i \qquad a_i \geq 0. \tag{1b}$$

All $W_i(\mathbf{p})$ and $W(\mathbf{p})$ are assumed to be continuous and single-peaked in $\mathbf{p}$ with different maximizing policy vectors.

This setting is identical to that of Grossman & Helpman (1994) except for minor notational adjustments that ease the exposition later on, and for the fact that both the cost of paying and the government's valuation of receiving contributions may be lobby-specific. A natural interpretation for $W_i(\mathbf{p})$ is gross profit of sector i (suggesting $b_i \geq 1$, and $b_i > 1$ if there are additional costs of collecting contributions), and $W(\mathbf{p})$ would be gross aggregate welfare including that of sectors without a lobby, $W(\mathbf{p}) \equiv \sum_i W_i(\mathbf{p})$.

2.2 Contribution-Schedules Equilibrium

Grossman & Helpman (1994) derive the subgame-perfect equilibrium of a two-stage game. In the first stage, the lobbies simultaneously and non-cooperatively offer *contribution schedules* to the government, defining payments as a function of the policy: $c_i = C_i(\mathbf{p})$. Afterwards, the government chooses policy so as to maximize its utility, given the contribution schedules. Letting a superscript o denote equilibrium, we have

$$\mathbf{p}^\circ = \underset{\mathbf{p}}{\operatorname{argmax}} \left[W(\mathbf{p}) + \sum_{i \in L} a_i C_i(\mathbf{p}) \right]. \tag{2}$$

Lobbies cannot offer negative contributions. For positive contributions, attention is restricted to *truthful contribution schedules*, in which a lobby's marginal payment cost equals its marginal utility gain due to the policy. This determines each contribution schedule up to a constant $B_i \geq 0$:

$$b_i C_i(\mathbf{p}) = \max\left[0, W_i(\mathbf{p}) - B_i\right] \qquad \text{for } i \in L. \tag{3}$$

(2) and (3) imply that the equilibrium policy maximizes a weighted sum of welfare and gross utilities:

$$\mathbf{p}^\circ = \underset{\mathbf{p}}{\operatorname{argmax}} \left[W(\mathbf{p}) + \sum_{i \in L} \frac{a_i}{b_i} W_i(\mathbf{p}) \right]. \tag{4}$$

Lobby i's policy weight $\frac{a_i}{b_i}$ equals the ratio of the marginal utility of the government of receiving the lobby's money to the lobby's marginal payment cost. Finally, each contribution schedule must minimize the lobby's payment cost $b_i c_i$ subject to the constraint that the government is better off by accepting it instead of rejecting it and receiving no contributions from the lobby. Thus, lobby i sets the government indifferent between choosing the optimal policy without the lobby:

$$\mathbf{p}^{-i} = \underset{\mathbf{p}}{\operatorname{argmax}} \left[W(\mathbf{p}) + \sum_{j \in L \setminus i} a_j C_j^\circ(\mathbf{p}) \right], \tag{5}$$

and the equilibrium policy with lobby i, $\mathbf{p}^\circ$:

$$W(\mathbf{p}^{-i}) + \sum_{j \in L \setminus i} a_j C_j^\circ(\mathbf{p}^{-i}) = W(\mathbf{p}^\circ) + \sum_{j \in L} a_j C_j^\circ(\mathbf{p}^\circ) \qquad \text{for } i \in L. \tag{6}$$

Rearranging (6) and substituting (3) yields

$$C_i^\circ(\mathbf{p}^\circ) = \frac{1}{a_i} \left[W(\mathbf{p}^{-i}) + \sum_{j \in L \setminus i} \frac{a_j}{b_j} W_j(\mathbf{p}^{-i}) - W(\mathbf{p}^\circ) - \sum_{j \in L \setminus i} \frac{a_j}{b_j} W_j(\mathbf{p}^\circ) \right] > 0 \quad \text{for } i \in L. \tag{7}$$

In equilibrium, each lobby pays what the government and the other lobbies lose by accommodating that lobby. Substituting (7) for all lobbies into (1) yields the equilibrium utilities:

$$V_i^\circ = W_i(\mathbf{p}^{-i}) + \frac{b_i}{a_i} \left[W(\mathbf{p}^\circ) + \sum_{j \in L} \frac{a_j}{b_j} W_j(\mathbf{p}^\circ) - W(\mathbf{p}^{-i}) - \sum_{j \in L} \frac{a_j}{b_j} W_j(\mathbf{p}^{-i}) \right] \text{ for } i \in L, \tag{8a}$$

$$G^\circ = \sum_{i \in L} \frac{W(\mathbf{p}^{-i})}{|L|} + \big(|L| - 1\big) \left[\sum_{i \in L} \left[\frac{W(\mathbf{p}^{-i})}{|L|} + \sum_{j \in L \setminus i} \frac{a_j}{b_j} \frac{W_j(\mathbf{p}^{-i})}{|L| - 1} \right] - W(\mathbf{p}^\circ) - \sum_{j \in L} \frac{a_j}{b_j} W_j(\mathbf{p}^\circ) \right]. \tag{8b}$$

The term in square brackets in (8a), which represents the lobby's gain of offering a contribution schedule, is positive by (4). Each lobby's equilibrium utility is the utility it would have without offering contributions, plus a share of the additional joint surplus due to its cooperation. Similarly, the government's equilibrium utility is the utility it would have on average if one lobby did not pay any contributions, plus the joint loss of the government and the other $|L|-1$ lobbies on average due to the participation of the residual lobby. This joint loss must be offset by $|L|-1$ lobbies. If there were just one lobby, it would just compensate the government for the welfare loss.

2.3 Nash Bargaining Solution

In this section, we drop the notion of a simultaneous offering of contribution schedules. Instead, the government and all lobbies meet and bargain. The outcome is determined by an asymmetric Nash bargaining solution, which implements the policy and the profile of contribution payments that maximize the Nash product $N(\mathbf{p},\mathbf{c})$. Using a superscript n to denote the outcome of bargaining, we have

$$N(\mathbf{p},\mathbf{c}) = \left[W(\mathbf{p}) + \sum_{i\in L} a_i c_i - G^d\right]^{\gamma} \cdot \prod_{i\in L}\left[W_i(\mathbf{p}) - b_i c_i - V_i^d\right]^{\gamma_i}, \tag{9a}$$

$$(\mathbf{p}^n,\mathbf{c}^n) \in \underset{\mathbf{p},\mathbf{c}}{\operatorname{argmax}}\, N(\mathbf{p},\mathbf{c}), \tag{9b}$$

where γ_i denotes the *bargaining weight* of lobby i and γ that of the government. V_i^d and G^d are the respective utility values in case of disagreement (see below). The first-order conditions for maximizing (9) are

$$\left[\frac{\gamma\partial W(\mathbf{p}^n)/\partial p_k}{W(\mathbf{p}^n) + \sum_{j\in L} a_j c_j^n - G^d} + \sum_{j\in L}\frac{\gamma_j \partial W_j(\mathbf{p}^n)/\partial p_k}{W_j(\mathbf{p}^n) - b_j c_j^n - V_j^d}\right] N(\mathbf{p}^n,\mathbf{c}^n) = 0 \quad \text{for } k\in K, \tag{10a}$$

$$\left[\frac{\gamma a_i}{W(\mathbf{p}^n) + \sum_{j\in L} a_j c_j^n - G^d} - \frac{\gamma_i b_i}{W_i(\mathbf{p}^n) - b_i c_i^n - V_i^d}\right] N(\mathbf{p}^n,\mathbf{c}^n) = 0 \quad \text{for } i\in L. \tag{10b}$$

With $N(\mathbf{p}^n,\mathbf{c}^n) > 0$, rearranging (10b) and substituting into (10a) yields

$$\frac{\partial W(\mathbf{p}^n)}{\partial p_k} + \sum_{j\in L}\frac{a_j}{b_j}\frac{\partial W_j(\mathbf{p}^n)}{\partial p_k} = 0 \qquad \text{for } k\in K, \tag{11}$$

so that the bargained policy can be written as

$$\mathbf{p}^n \in \underset{\mathbf{p}}{\operatorname{argmax}}\left[W(\mathbf{p}) + \sum_{i\in L}\frac{a_i}{b_i} W_i(\mathbf{p})\right], \tag{12}$$

which is identical to $\mathbf{p}^\circ$ from (4). Solving (10b) as a system of equations defining c_i^n for $i \in L$ yields

$$c_i^n = \frac{1}{b_i}\frac{\gamma + \sum_{j\in L\setminus i}\gamma_j}{\gamma + \sum_{j\in L}\gamma_j}\left[W_i(\mathbf{p}^\circ) - V_i^d\right] + \frac{1}{a_i}\frac{\gamma_i}{\gamma + \sum_{j\in L}\gamma_j}\left[G^d + \sum_{j\in L\setminus i}\frac{a_j}{b_j}V_j^d - W(\mathbf{p}^\circ) - \sum_{j\in L\setminus i}\frac{a_j}{b_j}W_j(\mathbf{p}^\circ)\right] \quad \text{for } i \in L. \tag{13}$$

Thus, each lobby pays a share of what it gains due to cooperation plus a share of what the government and the other lobbies lose due to its cooperation. If its bargaining power is low ($\gamma_i \to 0$), it contributes all its gains, if its bargaining power is high ($\gamma_i \to \infty$), it just compensates the others. Substituting (13) for all lobbies into (1) yields the equilibrium utilities:

$$V_i^n = V_i^d + \frac{b_i}{a_i}\frac{\gamma_i}{\gamma + \sum_{j\in L}\gamma_j}\left[W(\mathbf{p}^\circ) + \sum_{j\in L}\frac{a_j}{b_j}W_j(\mathbf{p}^\circ) - G^d - \sum_{j\in L}\frac{a_j}{b_j}V_j^d\right] \quad \text{for } i \in L, \tag{14a}$$

$$G^n = G^d + \frac{\gamma}{\gamma + \sum_{j\in L}\gamma_j}\left[W(\mathbf{p}^\circ) + \sum_{j\in L}\frac{a_j}{b_j}W_j(\mathbf{p}^\circ) - G^d - \sum_{j\in L}\frac{a_j}{b_j}V_j^d\right]. \tag{14b}$$

The term in square brackets in (14) represents the total gains of cooperation. Thus, each lobby's and the government's equilibrium utility are the respective disagreement utilities plus a share of the total gains of cooperation, weighted by their relative bargaining powers. The disagreement utilities are determined by the policy that would be chosen and the contributions that would be paid in that case: $G^d = W(\mathbf{p}^d) + \sum_{i\in L} a_i c_i^d$ and $V_i^d = W_i(\mathbf{p}^d) - b_i c_i^d$ for $i \in L$. Thus, the total gains of cooperation become

$$W(\mathbf{p}^\circ) + \sum_{j\in L}\frac{a_j}{b_j}W_j(\mathbf{p}^\circ) - W(\mathbf{p}^d) - \sum_{j\in L}\frac{a_j}{b_j}W_j(\mathbf{p}^d), \tag{15}$$

which is positive by (4).[1]

2.4 The Disagreement Policy in the Nash Bargaining Solution

By (12), the equilibrium policy $\mathbf{p}^\circ$ is defined independently of the disagreement situation. However, we need some assumption about the policy in case of disagreement, $\mathbf{p}^d$, in order to derive the equilibrium utilities and payments. In contrast to the contribution-schedules

[1] The gains of cooperation are independent of the contribution payments in case of disagreement. This would not be true, however, if disagreement implied the formation of additional lobbies because then (15) would become $W(\mathbf{p}^\circ) + \sum_{j\in L}\frac{a_j}{b_j}W_j(\mathbf{p}^\circ) - W(\mathbf{p}^d) - \sum_{j\in L}\frac{a_j}{b_j}W_j(\mathbf{p}^d) + \sum_{j\notin L} a_j c_j^d \gtreqless 0$.

equilibrium – where we have a policy $\mathbf{p}^{-i}$ without each respective lobby i – bargaining is a collective agreement. Thus, we need to know the policy that the government would choose if the bargaining in total broke down.

This choice depends on the commitment possibilities and the bargaining opportunities in case of disagreement. The simplest case is that in which there is no bargaining after disagreement. Then, no lobby can influence the policy so that all disagreement contributions c_i^d are zero. If the government cannot commit to a disagreement policy $\mathbf{p}^d$ ex ante, it just maximizes welfare ex post:

$$\mathbf{p}^d = \underset{\mathbf{p}}{\operatorname{argmax}}\, W(\mathbf{p}). \tag{16}$$

Else, if commitment is possible, it chooses $\mathbf{p}^d$ so as to maximize its equilibrium utility (14b) for $G^d = W(\mathbf{p}^d)$ and $V_i^d = W_i(\mathbf{p}^d)$:

$$\mathbf{p}^d = \underset{\mathbf{p}}{\operatorname{argmax}} \left[W(\mathbf{p}) - \frac{\gamma}{\sum_{j\in L} \gamma_j} \sum_{j\in L} \frac{a_j}{b_j} W_j(\mathbf{p}) \right]. \tag{17}$$

(16) and (17) coincide if $\gamma = 0$; in both cases, equilibrium utility of the government is just disagreement welfare. If $\gamma > 0$ and the government can commit to a disagreement policy, it increases the gains of cooperation and thus its own equilibrium utility by reducing the disagreement profits of the lobbies.

In contrast to the immediate policy choice after a breakdown implied by (16) or (17), disagreement may allow subsequent bargaining. Naturally, any potential coalition must include the government. In the context of Nash bargaining, such a central role for one player in subsequent coalitions is allowed by the models of Compte & Jehiel (2010) and Burguet & Caminal (2012).[2]

Compte & Jehiel (2010) introduce the *coalitional Nash bargaining solution*: If the grand coalition breaks down, subsequent coalitions can form. A subsequent coalition is *credible* if each member's equal share exceeds the equal share in the grand coalition. A player's bargaining position in the grand coalition is determined by the number of subsequent coalitions he could take part in and their common product. The coalitional Nash bargaining has a solution if and only if the number of credible subsequent coalitions is smaller than the number of players. For instance, it may hold that in case of disagreement the $|L| - 1$ coalitions con-

[2] See Okada (2010) for an n-person Nash bargaining approach where there is no comparably central player.

taining the government and all lobbies but one are credible. Then, the government receives more than the equal share of the surplus in equilibrium and all lobbies receive less.

Burguet & Caminal (2012) introduce the *R-solution* for Nash bargaining of three players. Should the trilateral negotiation fail, all players bargain simultaneously in three bilateral negotiations. If one bilateral negotiation's surplus is greater than the sum of the other two, it takes place with probability one. Else, all three bilateral negotiations take place with a positive probability. With one government and two lobbies, there are only two possible bilateral negotiations and the one with the higher surplus takes place with probability one. If the other bilateral negotiation's surplus is very small, the government and the lobby it actually bargains with share their surplus. Else, the government threatens to bargain with the other lobby and thus increases its share in the bilateral negotiation.

3 Discussion

We now compare the contribution-schedules equilibrium and the Nash bargaining solution. From (4) and (12), the equilibrium policy is identical: $\mathbf{p}^\circ = \mathbf{p}^n$. Thus, the approaches coincide if the contribution payments and, thus, the equilibrium utilities coincide: $V_i^\circ = V_i^n$ and $G^\circ = G^n$. They differ by:

$$\begin{aligned} V_i^\circ - V_i^n &= -b_i \left[C_i^\circ(\mathbf{p}^\circ) - c_i^n\right] \\ &= \frac{1}{\gamma a_i}\left[\gamma a_i \left(V_i^\circ - V_i^d\right) - \gamma_i b_i \left(G^\circ - G^d\right)\right. \\ &\quad \left. - \frac{\gamma_i b_i}{\gamma + \sum_{j\in L}\gamma_j} \sum_{j\in L} \frac{1}{b_j}\left[\gamma a_j \left(V_j^\circ - V_j^d\right) - \gamma_j b_j \left(G^\circ - G^d\right)\right]\right] \quad \text{for } i \in L, \qquad (18a) \\ G^\circ - G^n &= \sum_{j\in L} a_j \left[C_i^\circ(\mathbf{p}^\circ) - c_i^n\right] \\ &= -\frac{1}{\gamma + \sum_{j\in L}\gamma_j} \sum_{j\in L} \frac{1}{b_j}\left[\gamma a_j \left(V_j^\circ - V_j^d\right) - \gamma_j b_j \left(G^\circ - G^d\right)\right], \qquad (18b) \end{aligned}$$

where the first parts of (18a) and (18b) follow from (1) and the second parts follow from substituting (1) in (14). We characterize these differences in the following Proposition:

Proposition 3.1 *The contribution-schedules equilibrium and the Nash bargaining solution coincide if and only if*

$$\gamma a_i \left(V_i^\circ - V_i^d\right) = \gamma_i b_i \left(G^\circ - G^d\right) \qquad \textit{for all } i \in L. \qquad (19)$$

Else, if the left-hand side exceeds the right-hand side for lobby i, ceteris paribus, its equilibrium utility is greater in the contribution-schedules equilibrium than in the Nash bargaining solution, and vice versa.

Proof. Substituting $V_i^n = V_i^\circ$ and $G^n = G^\circ$ in (18) and rearranging yields:

$$\gamma a_i \left(V_i^\circ - V_i^d\right) = \gamma_i b_i \left(G^\circ - G^d\right) + \frac{\gamma_i b_i}{\gamma + \sum_{j\in L}\gamma_j} \sum_{j\in L} \frac{1}{b_j}\left[\gamma a_j \left(V_j^\circ - V_j^d\right) - \gamma_j b_j \left(G^\circ - G^d\right)\right] \quad \text{for all } i \in L, \tag{20a}$$

$$0 = \sum_{j\in L} \frac{1}{b_j}\left[\gamma a_j \left(V_j^\circ - V_j^d\right) - \gamma_j b_j \left(G^\circ - G^d\right)\right]. \tag{20b}$$

Substituting (20b) in (20a) yields (19). The remainder of the Proposition follows from substituting (19) in (18a) for $j \in L\backslash i$:

$$V_i^\circ - V_i^n = \frac{1}{\gamma a_i}\frac{\gamma + \sum_{i\in L\backslash j}\gamma_j}{\gamma + \sum_{j\in L}\gamma_j}\left[\gamma a_i \left(V_i^\circ - V_i^d\right) - \gamma_i b_i \left(G^\circ - G^d\right)\right]. \tag{21}$$

□

The Proposition can be applied to a special case. The contribution-schedules equilibrium and the Nash bargaining solution coincide if the following conditions are all fulfilled: There is only one lobby ($|L| = 1$), the government has no bargaining power ($\gamma = 0$), and the disagreement policy is defined by (16) or (17) (which coincide for $\gamma = 0$). With $\gamma = 0$, the left-hand side of (19) turns zero. By (16), G^d then is maximized welfare. With only one lobby, (8b) implies $G^\circ = W(\mathbf{p}^{-i})$, by (5), $\mathbf{p}^{-i}$ is welfare-maximizing as well. Thus, $G^\circ = G^d$.

In addition to our Proposition, we compare the two models concerning their total efficiency. Lobbying is inefficient for two reasons. Firstly, the equilibrium policy does not maximize welfare. Secondly, paying and receiving contributions causes social costs if $b_i > a_i$.[3] The equilibrium policy is the same in both approaches. Thus, we only need to compare the social costs due to paying and receiving contributions, $\sum_{i\in L}(b_i - a_i)\, c_i$. By (18), the difference is

$$\sum_{i\in L}(b_i - a_i)\left[C_i^\circ(\mathbf{p}^\circ) - c_i^n\right] = -\sum_{i\in L}\frac{b_i - a_i}{\gamma a_i b_i}\left[\gamma a_i \left(V_i^\circ - V_i^d\right) - \gamma_i b_i \left(G^\circ - G^d\right) - \frac{\gamma_i b_i}{\gamma + \sum\limits_{j\in L}\gamma_j}\sum_{j\in L}\frac{1}{b_j}\left[\gamma a_j \left(V_j^\circ - V_j^d\right) - \gamma_j b_j \left(G^\circ - G^d\right)\right]\right]. \tag{22}$$

[3] If lobbying provides information to the government that improves policy, it can also enhance welfare, see, e.g., Ball (1995) and Lagerlöf (1997). This can even be the case if policy is identical with and without lobbying, see, e.g., Bhagwati (1980).

As a special case, assume that (19) is fulfilled for $j \in L \backslash i$:

$$\sum_{i \in L} (b_i - a_i) \left[C_i^\circ(\mathbf{p}^\circ) - c_i^n\right] = \left[\frac{\sum_{j \in L} \gamma_j \frac{b_j - a_j}{\gamma a_j}}{\gamma + \sum_{j \in L} \gamma_j} - \frac{b_i - a_i}{\gamma a_i}\right] \cdot \frac{1}{b_i} \left[\gamma a_i \left(V_i^\circ - V_i^d\right) - \gamma_i b_i \left(G^\circ - G^d\right)\right]. \tag{23}$$

Thus, given that (19) is fulfilled for $j \in L \backslash i$ and $\frac{b_i - a_i}{a_i} \geq \frac{b_j - a_j}{a_j}$ for $j \in L \backslash i$, the contribution-schedules equilibrium is more efficient than the Nash bargaining solution if the left-hand side of (19) exceeds its right-hand side for lobby i, and vice versa. On the one hand, lobby i then pays less in the contribution-schedules equilibrium than in the Nash bargaining solution. On the other hand, G° declines so that the other lobbies must pay more to ensure that (19) remains fulfilled for them. However, as long as $\frac{b_i - a_i}{a_i} \geq \frac{b_j - a_j}{a_j}$ for $j \in L \backslash i$, total efficiency increases because total payments decline.

Finally, note that our Proposition compares the equilibrium utilities for a given set of available policies. However, the way that equilibrium policies are determined suggests that the lobbies would also care about the policy instruments available to the government. Grossman & Helpman (1994) suggest that a lobby would possibly prefer to restrict policy choice to inefficient instruments, because this may increase the difference between equilibrium utilities and the utilities in case the respective lobby does not take part, which reduces its equilibrium contributions, see (8a). In the Nash-bargaining model, the reasoning is similar, but the lobby would prefer to restrict policy choice so as to maximize (14a). Even if the equilibrium utilities coincide for a given set of available policies, the preferred policy instruments may not. Thus, a clearer understanding of the appropriate model of policy setting is also crucial for understanding the constitutional choice of allowed policy instruments.

Our comparison also assumes a given set of lobbies. The equilibrium policy and thus welfare is the same in both approaches for each set of lobbies. But the equilibrium utilities and the social costs due to paying and receiving contributions can develop differently if, e.g., one additional lobby forms.[4]

To sum up, the two models usually do not imply the same contribution payments and equilibrium utilities. They coincide if the government has no bargaining power (understood as the respective parameter in the Nash-bargaining function) and there is only one lobby.

[4] For a given set of lobbies, free entry into an organized sector leads to rent dissipation. This may lead to a breakdown of the sector's lobby, for example if it cannot prevent free riding of the entrants. See Grossman & Helpman (1996) and Baldwin & Robert-Nicoud (2007).

Else, an additional assumption is necessary for the Nash-bargaining model: Which policy is chosen in case of disagreement? By contrast, this is endogenous for the contribution-schedules model. We demonstrate, for a given assumption about disagreement utilities, that the two models only coincide if each lobby has a certain relative bargaining power compared to that of the government. Finally, we have compared the models concerning their total efficiency and indicated that their institutional implications can differ.

References

Baldwin, Richard E. & Frédéric Robert-Nicoud (2007), 'Entry and Asymmetric Lobbying: Why Governments Pick Losers', *Journal of the European Economic Association* **5**(5), 1064–1093.

Ball, Richard (1995), 'Interest Groups, Influence and Welfare', *Economics and Politics* **7**(2), 119–146.

Bhagwati, Jagdish N. (1980), 'Lobbying and Welfare', *Journal of Public Economics* **14**(3), 355–363.

Burguet, Roberto & Ramon Caminal (2012), 'Simultaneous Nash Bargaining with Consistent Beliefs'. Online at: `http://www.ed.ac.uk/files/imports/fileManager/Burguet_R_April2012.pdf`.

Compte, Olivier & Philippe Jehiel (2010), 'The Coalitional Nash Bargaining Solution', *Econometrica* **78**(5), 1593–1623.

Dharmapala, Dhammika (1999), 'Comparing Tax Expenditures and Direct Subsidies: The Role of Legislative Committee Structure', *Journal of Public Economics* **72**(3), 421–454.

Gawande, Kishore, Pravin Krishna & Marcelo Olarreaga (2009), 'What Governments Maximize and Why: The View from Trade', *International Organization* **63**(3), 491–532.

Goldberg, Pinelopi Koujianou & Giovanni Maggi (1999), 'Protection for Sale: An Empirical Investigation', *The American Economic Review* **89**(5), 1135–1155.

Grossman, Gene M. & Elhanan Helpman (1994), 'Protection for Sale', *The American Economic Review* **84**(4), 833–850.

Grossman, Gene M. & Elhanan Helpman (1996), ‘Rent Dissipation, Free Riding, and Trade Policy’, *European Economic Review* **40**(3), 795–803.

Grossman, Gene M. & Elhanan Helpman (2001), *Special Interest Politics*, MIT Press, Cambridge MA and London.

Lagerlöf, Johan (1997), ‘Lobbying, Information, and Private and Social Welfare’, *European Journal of Political Economy* **13**(3), 615–637.

Maggi, Giovanni & Andrés Rodríguez-Clare (2000), ‘Import Penetration and the Politics of Trade Protection’, *Journal of International Economics* **51**(2), 287–304.

Okada, Akira (2010), ‘The Nash Bargaining Solution in General n-Person Cooperative Games’, *Journal of Economic Theory* **145**(6), 2356–2379.

Schopf, Mark & Achim Voss (2016), ‘Bargaining over Natural Resources: Governments between Environmental Organizations and Extraction Firms’, Mimeo.