ECONSTOR
Make Your Publications Visible.

A Service of

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Schneider, Maik

Conference Paper

Blackmailing Lobbyists

Beiträge zur Jahrestagung des Vereins für Socialpolitik 2010: Ökonomie der Familie - Session: Political Economy: Lobbying and Preferences, No. E17-V1

Provided in Cooperation with:
Verein für Socialpolitik / German Economic Association

Suggested Citation: Schneider, Maik (2010) : Blackmailing Lobbyists, Beiträge zur Jahrestagung des Vereins für Socialpolitik 2010: Ökonomie der Familie - Session: Political Economy: Lobbying and Preferences, No. E17-V1, Verein für Socialpolitik, Frankfurt a. M.

This Version is available at:
https://hdl.handle.net/10419/37483

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

Blackmailing lobbyists*

Maik T. Schneider
CER-ETH
Center of Economic Research
at ETH Zurich
8092 Zurich, Switzerland
schneider@mip.mtec.ethz.ch

February 2010

Abstract

We examine lobby influence on policy outcomes in a legislative vote-buying model with two competing lobbyists and endogenous policy proposals. We compare two polar cases: (1) the committee or (2) the lobbyist seeking policy change writes the bill. Surprisingly, we find that if the issue's salience is low, the committee proposes more extreme policy changes than the pro-change lobbyist even though the policy preferences of the committee are more moderate. The opposite is true if salience is high. We show that the extreme proposals when salience is low do not necessarily involve lower welfare relative to the lobbyist's proposal.

Keywords: legislative lobbying, vote buying, legislatures, political economy

JEL: D72, P16

*I would like to thank Christian Almer, Johannes Becker, Fernanda Brollo, Sebastian Fehrler, Hans Gersbach, Hans Haller, Massimo Morelli, James Snyder, Ralph Winkler and seminar participants at ETH Zurich for valuable comments on an earlier version.

1 Introduction

How are policy outcomes affected by lobbying at the stage of crafting the proposal when there is vote-buying in the following legislative vote? How does this depend on the salience of the issue? And would the policy outcome yield higher welfare if the committee could make the proposal without being directly influenced by outside lobbyists' "money"?

This paper examines these questions by augmenting a legislative lobbying model of the Groseclose and Snyder (1996)-type with an endogenously derived policy proposal. Our model considers two lobbyists that represent two interest groups with opposed policy preferences. The ideal policies of the lobbyists are on either side of the relevant policy interval and the legislators' preferences are less extreme, i.e. their bliss points lie in the interior of the interval. With respect to the policy proposal we compare two polar cases: (1) the committee resp. the committee chair (i.e. a member of the legislature) makes the proposal without any direct influence by the lobbyists when crafting the bill and (2) the lobbyist seeking policy change crafts the proposal which a sponsor introduces to the legislature at no cost. The second scenario can be perceived as an extreme form of lobby influence at the proposal stage.

Surprisingly, we find that when the median legislator's preferences favor the status quo and the salience of the issue is low, the committee proposes a more extreme policy change than the pro-change lobbyist himself. This is the case even though the committee chair knows that the policy change will be approved by the legislative vote, and his policy preferences are more moderate than those of the lobbyist. The intuition of this result runs as follows. The degree of salience of an issue indicates how much the committee chair cares about his policy preference relative to payments he obtains from the lobbyists. The further away the policy proposal from the status quo, the higher the payments necessary for the pro-change lobbyist to outcompete the lobbyist defending the status quo in the legislative vote-buying game. Since utilities are assumed to be strictly concave, the payments for the winner of the vote-buying game are convex. Hence the lobbyist seeking policy change faces concave benefits (his direct utility gain from policy) and convex costs (the payments necessary in the vote-buying game) when moving the proposal away from the status quo towards his ideal point. By contrast, the committee chair with moderate policy preferences faces both convex and increasing costs (from direct utility from policy) and convex and increasing benefits (payments

he obtains from the lobbyists) when moving towards the ideal point of the pro-change lobbyist. If salience is low, the "money"-part of the committee chair's utility dominates and his optimization problem becomes convex leading him to propose the most extreme policy change possible. Essentially via his proposal decision he is skimming off the surplus of the pro-change lobbyist. The lobbyist chooses more moderate policy change as for him the convex costs of getting the legislation approved make extreme proposals very expensive. The result changes to the opposite if salience is high. Then the committee proposes a more moderate policy change than the pro-change lobbyist as convex costs from declining direct utility from policy when moving away from the committee chair's bliss point dominate.

By the same intuition, if the median of the legislature is pro policy change and salience is low, it may occur that the committee proposes a policy change that is too extreme to be implementable, even though the bliss point of the committee chair could be enacted. This will not happen if salience high. In the latter case, the committee proposes an implementable policy that is (weakly) more moderate than the one that would be introduced by the pro-change lobbyist.

Snyder (1991) considers a similar model but with only one lobbyist. He looks at the lobbyist's proposal but does not formally consider a legislator crafting the bill. With respect to the latter he states in a footnote that

> "the most interesting point to make about blackmail is that in order for it to succeed the current status quo must be closer to the lobbyist's ideal point than the median of the legislature, and the proposed policy must be closer to the median than the current status quo. This means that when lobbyists cry "Congress is blackmailing me!" the cries should be translated "Congress is threatening me to move towards the median!". The latter sounds far less sinister, and in the eyes of many democratic theorists is precisely what the legislature should do."

Our model shows that the translation of the lobbyists' cries that Snyder (1991) proposes is not appropriate when there are two competing lobbyists with opposed political preferences. Then the policy proposal by the legislator can be far from the median and much more extreme than the status quo precisely for the reason to extract rents from the lobbyists.

With respect to (utilitarian) welfare we show that when the median of the legislature

prefers the status quo and salience is low, the committee's extreme proposal is not necessarily worse than the more moderate one of the pro-change lobbyist. In fact if the committee chair's bliss point is very moderate, his proposal yields higher welfare than the pro-change lobbyist's agenda only if salience is below a critical level. By contrast, independent of the level of salience, the committee's proposal involves at least the welfare level of the pro-change lobbyist's proposal if the median of the legislature is in favor of change.

In summary we find that policy outcomes and lobbying activity substantially change with the degree of salience. To know how policy outcomes are affected when salience is low is important as for example Baumgartner et al. (2009) report that among the 98 randomly selected issues they followed in the U.S.-Congress between 1999 - 2002, 70% had no TV news coverage and "half of the issues had 15 or fewer news stories published in the 29 major U.S. newspapers indexed by Lexis-Nexis".[1] They conclude that on most issues, lobbyists work at very low levels of public visibility. Moreover we argue later in the paper that the measure of salience we use can also be interpreted as a measure of institutional quality. With this interpretation our analysis might help to better understand why policy outcomes in countries with low quality institutions oftentimes substantially differ from those in the developed world.

The paper is organized as follows. The next section describes the related literature. In section 3, we introduce the model and characterize the subgame perfect equilibrium of the lobbying game. The following two sections derive and discuss the different proposals made by the committee and the lobbyists. In particular, Section 4 explores the case where the ideal point of the median legislator coincides with the status quo and Section 5 where the median of the legislature differs from the status quo. Welfare aspects of the different proposals are examined in Section 6. In Section 7, we discuss extensions of the model with respect to the stage of writing the proposal and the vote-buying subgame. Section 8 concludes.

2 Related Literature

Other than the earlier mentioned article by Snyder (1991), our paper is closely related to Groseclose and Snyder (1996) and Breton and Zaporozhets (2009) who examine the Groseclose and Snyder (1996) set-up when the legislators have preferences over

[1] See Baumgartner et al. (2009, p. 18).

outcomes rather than their vote and show the connection with notions from cooperative game theory. The major difference of the present paper is that the policy proposal is endogenously determined. In fact, in their conclusion, Groseclose and Snyder suggest to extent the model to endogenize bill selection. To the best of our knowlegde there is no other paper that has studied such a model.

Recently, Dekel et al. (2008) and Dekel et al. (2009) suggested a vote-buying game that does not end at a pre-determined stage but only after two consecutive offers go by without any change in who would win. The papers study different variants of this type of game. Even though the focus of the first paper is on general elections, the model can be interpreted as a legislative vote-buying game where a policy proposal is up for vote against the status quo. In section 7.1 we discuss whether our results would change if we chose such a vote-buying model as a lobbying subgame after the proposal has been made rather than the Groseclose and Snyder (1996) set-up. We argue that for some variants of the Dekel et al. (2008) and Dekel et al. (2009) lobbying model, our results would change. In others, however, it is possible to obtain similar results as in our basic model. This suggests that our results are not specific to the Groseclose and Snyder (1996) set-up.

There is also an interesting relation to Diermeier and Myerson (1999) who examine the internal organization of legislatures. In their basic framework they also make use of the Groseclose and Snyder (1996) set-up with exogenously given policy proposals and consider a game between different chambers of the legislature that strategically choose their internal organization in order to maximize the payments they receive from the interest groups. In our model, it is simply the other way around: the organization of the legislature is given and the policy proposer chooses a policy proposal to maximize his benefit.

Other legislative lobbying models with endogenous policy proposals include Baron (2006), Helpman and Persson (2001). Baron (2006) also presents a model of competitive lobbying in a majority-rule legislature with endogenous agenda setting under complete information. His focus is different from ours in that he considers only two possible proposals and examines under what conditions both lobbies are active in equilibrium and when there are minimal winning coalitions or supermajorities. Helpman and Persson (2001) combine a common agency approach with vote-buying in the legislature. However, Helpman and Persson (2001) do not model direct competition between the lobbyists and focus on the variations of the political system on the distribution of

policy benefits.

3 The Model

The model considers a unicameral legislature that makes a decision by majority-rule on a policy t. The policy is chosen from a closed and connected set $\tau \subset \mathbb{R}$. Initially status quo policy $s \in \tau$ is in place. For simplicity, the legislature is assumed to be continuous and comprises a set of legislators $\mathcal{N}$ of measure N. The utility gain a legislator $I \in \mathcal{N}$ derives from policy t relative to the status quo is denoted by $v_I(t) = u_I(t) - u_I(s)$. The function $u_I(t)$ is strictly concave on τ and bounded from above and below. For most of the paper, we assume that $u_I(t)$ takes the form $-\frac{\gamma_I}{2}(t-i^*)^2$ where i^* represents legislator I's most preferred policy and $\gamma_I > 0$ indicates the intensity of his preferences.[2] A legislator also enjoys another good d that we call "money". Together, legislator I's total utility gain of a policy change towards t is defined as $V_I(t,d) := \alpha v_I(t) + d$. We use m to denote the median preference in the legislature.[3] The parameter α is a measure of the salience of the issue. It reflcts that the if the issue is publicly highly visible, a legislator more strongly adheres to his respectively his constituency's preferences.[4] Suppose legislator I has the power to make a policy proposal for a vote of the legislature against the status quo. From the literature we know that without any external influence, he proposes

$$i = \begin{cases} i^*, & \text{if } i^* \in (s, 2m-s) \\ s, & \text{else.} \end{cases} \tag{1}$$

Now we introduce two interest groups, X and Y, that try to influence legislative decision making to their benefit. They comprise a measure l_J of homogeneous members who are characterized by $v_J(t) = u_J(t) - u_J(s)$ and $u_J(t) = -\frac{\gamma_J}{2}(t-j^*)^2$, $J \in \{X,Y\}, j^* \in \{x^*, y^*\} \subset \tau$. The policy $j^*, x^* \neq y^*$ indicates the lobby-members ideal policy and γ_J how much they care about moving away from it. Without loss of generality, we assume that $x^* < y^*$. An interest group's total utility gain from changing the status quo towards policy t can be written as $V_J(t,D) := l_J v_J(t) + D$. In the following we assume that each interest group is represented by one lobbyist acting on its behalf. We neglect agency problems. Consequently, lobbyist $J \in \{X,Y\}$ acts so as to maximize $V_J(t,D)$.

[2] Legislator I's utility may be interpreted as reflecting the median preference in his constituency.

[3] The composition of the legislature could be the result of a general election. Then under certain assumptions the median legislator reflects the policy preferences of the median voter.

[4] Such a specification is also used by Snyder (1991).

In this paper, we are interested in the situation where the two lobbyists would like to change the status quo in opposing directions. I.e. we assume that $x^* < s < y^*$. For simplicity, we constrain the possible set of policies to $\tau = [x^*, y^*]$ and assume that the ideal points of the legislators are within τ. This means that the legislators' preferences tend to be more moderate than those of the interest groups. Given the status quo policy and the utility functions, we can divide the policy space τ into subsets of policies preferred to the status quo by each lobbyist. The set of policies preferred to the status quo by lobby J is defined by $\tau_J := \{t \in \tau : v_J(t) > 0\}$.[5] The properties of the utility functions imply that $\tau_Y \cap \tau_X = \emptyset$, $\forall s \in \tau$.

3.1 Lobbying

Although there are many channels through which lobbying takes place, we assume that "money" is paid to the legislators.[6] Suppose that a policy t is up for vote against s in the legislature. If lobbyist J is in favor of the proposal, he possesses the maximal willingness $l_J v_J(t)$ to support t. In case J prefer the status quo, he is willing to spend $-l_J v_J(t)$ to prevent policy t. There are no further constraints on the lobbyists' spending. Thus, we denote the lobby groups' budgets by $B_J(t) := l_J|v_J(t)|$. The lobbying expenses of the interest groups are shared equally among their members.

The lobbyists may use the budget to make payments to the legislators. For each legislator $I \in \mathcal{N}$, we use $b_J(I,t)$ to denote the offer of interest group J given policy proposal t for a vote of legislator I in favor of the proposal if $t \in \tau_J$ and against the proposal otherwise. Accordingly, $b_J(\cdot,t)$ is referred to as lobbyist J's offer function. Each offer function must respect $\int_{\mathcal{N}} b_J(I,t)\,dI \leq B_J(t)$.

3.2 Voting behavior of the legislators

Legislators are assumed to possess preferences over outcomes rather than over the *act of voting* itself. The legislators take the offer functions $b_J(\cdot,t)$ as given and vote for the alternative that yields the highest expected utility. If no payments are made, they

[5] In our set-up, the sets can also be expressed as follows: $\tau_X := \{t : t < s\}$ and $\tau_Y := \{t : t > s\}$.

[6] This assumption is made by virtually the entire lobbying literature except the one on informational lobbying. The "money"-payments can be generally interpreted as something which is beneficial for the receiver and costly for the donor. They can range from explicit bribery over providing lucrative positions for politicians etc.

vote for the policy alternative that yields the highest direct utility from policy.[7] Since the legislature comprises a continuum of legislators, no single legislator is pivotal. This means that each legislator votes in favor of the lobby group that makes the highest offer. A legislator I who has received at least one positive payment offer supports policy proposal t if and only if

$$b_J(I,t) \geq b_K(I,t). \tag{2}$$

where $J, K \in \{X, Y\}, J \neq K$. J denotes the lobbyist that is in favor of the policy proposal and K is the one preferring the status quo. As a tie-breaking rule we have assumed in (2) that when positive payments are offered and legislators are indifferent, legislators vote against the status quo.

The assumptions that legislators care about outcomes and that the legislature is continuous, i.e., no legislator is pivotal, simplify the analysis. Besides simplicity another justification to assume away pivot considerations is the following. As will become clear later, with our model specification it is cheapest for the winner of the lobbying game to bribe a supermajority of legislators. Thus no legislator will be pivotal, even if the legislature were discrete.[8]

3.3 The political game

Now the entire political game can be described. In principle, it is a lobbying game in the Groseclose and Snyder (1996) style augmented by a policy proposer that (endogenously) determines the proposal to be voted on in the legislature. In the remainder of this section, we refer to the first-mover lobbyist by J and to the second mover lobbyist by K. The game possesses the following structure:

1. The policy proposer decides on a policy proposal t_g to put up for vote against s.
2. Lobbyist J offers a payment schedule $\{b_J(I,t_g)\}_{i\in\mathcal{N}}$ to the legislators for a vote pro t_g if $t_g \in \tau_J$ and for a vote in favor of the status quo if $t_g \notin \tau_J$.
3. Lobbyist K offers $\{b_k(I,t_g)\}_{i\in\mathcal{N}}$ for a vote pro t if $t_g \in \tau_K$ and for a vote in favor of the status quo if $t_g \notin \tau_K$.

[7] That is, they vote for proposal t if $v(t) > 0$ and against it otherwise.
[8] See also Dal Bo (2007) for a similar argument.

4. Each legislator I that receives at least one positive payment offer votes for t_g if and only if $b_J(I, t_g) \geq b_K(I, t_g)$, where $t_g \in \tau_J$ and $J \neq K$. If he obtains no positive payment offer, he votes for t_g if and only if $v_I(t_g) \geq 0$. The policy proposal will be implemented if a majority of legislators votes in favor of it. Otherwise the status quo remains in place.

By purpose we have not exactly specified which lobbyist moves first in the lobbying subgame. For any proposal $t_g \in \tau$ our set-up implies that there is one lobbyist preferring the proposal to the status quo and another preferring the status quo to t_g. For illustrative purposes, suppose that $t_g \in \tau_X$. Then lobbyist X is in favor of the policy change and Y opposes it. If the median legislator is in favor of policy change, the legislature will accept the proposal when no bribes are paid. In this case, lobby X has no incentive to act as long as Y does not make any offers. Hence, X would be the natural second mover. Would the median legislator prefer the status quo, lobbyist Y would be the natural second mover by the previous argument. Consequently, we assume that given a policy proposal, the lobbyist that shares the voting preferences of the median legislator is the second mover, whereas the other lobbyist has to actively change the legislature's voting behavior and thus needs to move first.

3.4 Equilibrium in the lobbying subgame

The lobbying subgame starts once a proposal has been introduced for a vote against the status quo. In order to determine the equilibrium in the lobbying subgame, it is necessary to know how large a budget is necessary for the first mover J to outcompete the second mover K in the lobbying game.

The structure of the lobbying subgame in the present paper can be perceived as a variant of Groseclose and Snyder (1996) where legislators have no preference over voting for or against the proposal. This allows to infer from Proposition 1 in Groseclose and Snyder (1996), that it is optimal for J to follow a leveling strategy when making its offers. A strategy is leveling if $b_J(I, t_g)$ is the same for *almost all* bribed legislators.[9] The intuition behind a leveling strategy is to leave no 'soft spots' to the second mover of the lobbying subgame. A more detailed discussion of leveling strategies can be found in Groseclose and Snyder (1996).

[9]'Almost all' means all bribed legislators except a set of measure zero.

We can now determine how expensive it is for J to ensure a majority of votes in the legislature for its preferred policy alternative. We use n to denote the measure of legislators that receive payments additional to those necessary for a majority. This implies that the size of the supermajority that votes for the preferred policy of interest group J comprises $\frac{N}{2}+n$ legislators.[10] n is the measure of legislators that interest group K needs to buy back in order to ensure the approval of its preferred alternative. Hence, given proposal t, for J to win the lobbying subgame, each of the bribed legislators must receive payments of at least

$$\frac{B_K(t)}{n}.$$

As a leveling strategy is cheapest for J, the total payments to establish a supermajority of size $\frac{N}{2}+m$ accrue to

$$T_J(t) = \Big[\frac{N}{2}+n\Big]\frac{B_K(t)}{n}.$$

Since the objective is declining in n, it is optimal to make payments to the entire legislature, i.e. $n^{opt} = \frac{N}{2}$. Consequently, the minimal amount of payments by J necessary to win the lobbying game reads

$$T_J(t) \;:=\; 2\,B_K(t). \tag{3}$$

The factor by which lobbyist J's budget needs to exceed that of K in order to win the lobbying subgame has been called the *hurdle factor* by Diermeier and Myerson (1999). In this particular case, we obtain a hurdle factor of 2.

We are now in the position to characterize the equilibrium in the lobbying subgame. Two situations can arise: The willingness to pay of the first mover $B_J(t)$ is (1) (weakly) higher than $T_J(t)$ or it is (2) lower than $T_J(t)$. In the first case, J will spend $T_J(t)$ to ensure a majority of legislative votes in its favor. In the second case it will abstain from offering payments.[11] The second mover lobby K will not make a positive offer in the first situation as it has no chance of influencing the legislative vote. In the second situation K secures a minimal majority in its favor by offering a sufficient number of legislators a minimal payment of ε if the majority of legislators would otherwise vote in discord with its preferences. Lobbyist K will make no positive payment offer if

[10] Groseclose and Snyder (1996) showed that it can be less expensive for the first mover, in our case interest group X, to form a supermajority in the legislature rather than a minimal winning coalition.

[11] The reason is that the second mover only needs to secure a minimal majority and will buy back the "cheapest" legislators. By this, the first mover cannot make a positive offer without incuring some costs for itself. Thus, when knowing that it will lose the lobbying subgame a positive payment offer is not profitable.

the majority of the legislators votes in accordance with its preferences anyway. We summarize our observations in the following proposition:[12]

Proposition 1 (Equilibrium in the lobbying subgame)
For each policy proposal $t \in \tau$, there exists an equilibrium in the lobbying subgame which implies that

(i) if $B_J(t) \geq T_J(t)$

Stage 2 *J makes payments $b_J(I,t) = \frac{2B_K(t)}{N}$ to all of the legislators for a vote in its favor.*

Stage 3 *K does not make any payment offer.*

Stage 4 *All legislators vote in favor of J. Hence, if $t \in \tau_J$, t will be implemented, otherwise the status quo prevails.*

(ii) if $B_J(t) < T_J(t)$

Stage 2 *J makes no payment offers.*

Stage 3 *K makes no payment offers if the majority of legislators will vote in its favor anyway.*
Otherwise K offers a minimal payment of ε to a sufficiently large number of legislators to secure a minimal majority of legislators to vote in its favor.

Stage 4 *A majority of legislators votes in favor of K. If $t \in \tau_K$, t will be implemented, otherwise the status quo prevails.*

Note that in the case where the majority of legislators will not vote in favor of K without payments, the legislators who are offered a minimal payment of ε by the second mover lobby are not uniquely determined. This is the only reason why the equilibrium is not unique. In the remainder of the paper we concentrate only on the substantial payments that the first mover needs to make in order to win the lobbying subgame. In equilibrium, J offers the same amount of payments to all legislators. Hence, we can drop indices and write $b(t)$ instead of $b_J(I,t)$. When bribes are paid in equilibrium, we have

$$b(t) = \frac{2l_K}{N}|v_K(t)|. \tag{4}$$

[12] A formal proof is available upon request.

The equilibrium in the lobbying subgame allows us to characterize which policy proposals will be approved by the legislature and which ones have no chance of being implemented. This will be an important information for the policy proposer when crafting his proposal. In the analysis, it makes a difference whether or not the status quo s is identical with the ideal policy of the median legislator m. We start with the case $m = s$.

4 Status quo coincides with median preference in legislature ($s = m$)

If the status quo policy corresponds to the most preferred policy of the median legislator no policy change will occur without lobbying. The next subsection provides a characterization of the partition of the policy space into implementable and non-implementable policy sets.

4.1 Partitions of the policy space

In order to identify the policies that can be implemented, it is convenient to use the function

$$F_J(t) := l_J v_J(t) + 2\, l_K\, v_K(t), \tag{5}$$

where J still indicates the first mover lobby and K the second mover lobby. $F_J(t)$ indicates for each policy t whether the first-mover's budget is higher than the amount necessary to outcompete the second mover. Suppose, e.g., that a proposal t favors lobbyist X, i.e. $t \in \tau_X$. Without any payments this proposal will be defeated, as the median legislator will prefer the status quo. The first mover lobby, in this case X, can only influence the legislative vote in its favor if its budget exceeds the amount necessary to form a winning coalition. This is the case if $F_X(t) \geq 0$. Similarly, the argument holds for lobbyist Y if the proposal is in τ_Y. Consequently, a policy $t \in \tau_J$ is implementable if and only if $F_J(t) \geq 0$.[13] Formally we subsume all implementable policies within each of the sets τ_J, $J \in \{X, Y\}$ by $\tau_J^a := \{t \in \tau_J : F_J(t) \geq 0\}$. We denote the set of all

[13] Equivalently, we could define

$$F(t) := \begin{cases} F_X(t), & \text{if } t \in \tau_X, \\ F_Y(t), & \text{if } t \in \tau_Y \cup s. \end{cases} \tag{6}$$

Using this definition, a policy $t \in \tau$ is implementable if and only if $F(t) \geq 0$.

implementable policies by $\tau^I := \tau_Y^a \cup \tau_X^a$. Similarly, the sets of policies that cannot be implemented are referred to by $\tau_J^{\neg a} := \tau_J \setminus \tau_J^a$. All non-implementable policies are subsumed in $\tau^{\neg a} := \tau_Y^{\neg a} \cup \tau_X^{\neg a}$. Equation (6) reveals two important properties. First, $F_J(t)$ is a strictly concave function on τ as both $v_X(t)$ and $v_Y(t)$ are strictly concave. Second, $F_J(s) = 0$ which follows from $v_X(s) = v_Y(s) = 0$. The two properties imply that $F_J(t)$ possesses at most two roots in the interval τ with one of them being s. We can now fully characterize the sets of implementable and non-implementable policies. For this purpose we use $F_J'(s)$ to denote $\frac{F_J(t)}{dt}\Big|_{t=s}$.

Proposition 2

(i) If $F_Y'(s) > 0 \wedge F_Y(y^*) \geq 0$, then $\tau_Y^a = \tau_Y$ and $\tau_X^{\neg a} = \tau_X$

(ii) If $F_Y'(s) > 0 \wedge F_Y(y^*) < 0$, then $\tau_Y^a = (s, \hat{y}]$, $\tau_Y^{\neg a} = (\hat{y}, y^*]$ and $\tau_X^{\neg a} = \tau_X$, where $\hat{y} \neq s$ and $F_Y(\hat{y}) = 0$.

(iii) If $F_X'(s) \geq 0 \wedge F_Y'(s) \leq 0$, only the status quo is implementable.

(iv) If $F_X'(s) < 0 \wedge F_X(x^*) < 0$, then $\tau_Y^{\neg a} = \tau_Y$, $\tau_X^a = [\hat{x}, s)$ and $\tau_X^{\neg a} = [x^*, \hat{x})$, where $\hat{x} \neq s$ and $F_X(\hat{x}) = 0$.

(v) If $F_X'(s) < 0 \wedge F_X(x^*) \geq 0$, it follows that $\tau_Y^{\neg a} = \tau_Y$ and $\tau_X^a = \tau_X$.

The proof can be found in the appendix. Intuitively Proposition 2 can be summarized as follows: The slope of $F_J(t)$ at $t = s$ indicates on which side of s function $F(t)$ attains its maximum. In other words, it indicates whether the set of implementable policies is a subset of τ_Y or τ_X. Consider e.g. item (i) of the proposition. As $F_Y'(s) > 0$ there exist policies $t \in \tau_Y$ for which $F_Y(t) > 0$, i.e. policies that are implementable. Due to its strict concavity $F_Y(t)$ possesses at most one further root other than s. The second inequality in (i), $F_Y(y^*) \geq 0$ indicates whether this root is smaller or larger than y^*. In the latter case, the entire set τ_Y will be implementable. Otherwise τ_Y also comprises non-implementable policies. This is the situation in item (ii). The same intuition can be applied to the cases (iv) and (v). In case that $F_Y'(s) \leq 0$ we have $F_Y(t) < 0$ for all $t \in \tau_Y$ and hence $\tau_Y = \tau_Y^{\neg a}$. Similarly, $F_X'(s) \geq 0$ implies $F_X(t) < 0$ for all $t \in \tau_X$ and thus $\tau_X = \tau_X^{\neg a}$. This illustrates why the status quo prevails in (iii). Further inspection of Proposition 2 reveals that the implementable set comprises either policies favoring X or policies favoring Y but not both. As this insight will be important for the analysis it is subject to the following corollary:

Corollary 1

The set of implementable policies will never comprise both, policies favoring X and policies favoring Y.

Formally: If $\tau^a \neq \emptyset$, then $\tau^a \subseteq \tau_X$ or $\tau^a \subseteq \tau_Y$.

An illustration of case (ii) of Proposition 2 is given by Figure 1. As can be seen in the graph, the slope of $F_Y(t)$ at s is positive. Hence, the implementable set of policies (all t for which $F_Y(t) \geq 0$) is a subset of the policies favoring Y. However, as $F(y^*) < 0$, the implementable set does not comprise all policies benefiting Y. The most favorable policies for Y can be prevented by lobbyist X.

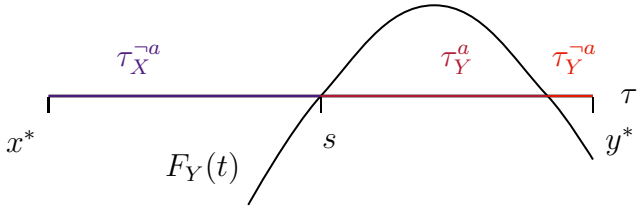

Figure 1: Illustration of item (ii) of Proposition 2.

Proposition 2 outlines five different decision environments the policy proposer may face when considering his policy proposal. In particular, if $\tau_J^a \neq \emptyset$, then policy change in favor of lobbyist J is possible, whereas the best lobbyist $K \neq J$ can hope for is that the status quo remains. In the following we speak of lobbyist J as the lobbyist *seeking policy change* if $\tau_J^a \neq \emptyset$ and as the lobbyist *opposing policy change* or *defending the status quo* if $\tau_J^a = \emptyset$.

4.2 Policy Proposals

Having characterized the partition of the policy space, we can now determine and compare the optimal policy proposals of the lobbyists and the (congressional) committee. The maximization problems of the different potential policy proposers can be solved by a two step procedure. First, within each of the relevant subsets of τ, the most preferred policy is identified and in a second step the one is chosen that yields the highest utility level among those four policies. We assume that if no policy yields strictly higher utility than the status quo, the latter is proposed. Before we examine the different proposals, we establish the following lemma:

Lemma 1

If the status quo policy is the most preferred policy of the median legislator, i.e. $m = s$, then all proposals that are not implementable ($t \in \tau^{\neg a}$) are neutral in the sense that neither legislators nor lobbyists will gain in utility relative to the status quo.

The proof runs as follows: A proposal to change the status quo can only be successful if supported by a sufficiently strong lobbyist. If this is not the case, then in the equilibrium of the lobbying subgame as depicted in Proposition 1, no payments will be made and the proposal will be defeated. Hence the status quo remains and no redistribution of resources occurs.

By way of Lemma 1, the following analysis concentrates on the proposer's optimal choice within the implementable set and then verifies that the utility gain relative to the status quo is (strictly) positive.

4.2.1 Proposals by the lobbyists

Consider lobbyist X and suppose first that $\tau_X^a \neq \emptyset$. Lobbyist X's best proposal in τ_X^a maximizes $V_X(t) = \tilde{l}_X v_X(t) - T_X(t) = \tilde{l}_X v_X(t) + 2\tilde{l}_Y v_Y(t) = F_X(t)$. The first order condition yields:

$$-\frac{v_X'(t)}{v_Y'(t)} = 2\frac{l_Y}{l_X}$$

Inserting the specific quadratic utility function we obtain:

$$x = \frac{\tilde{l}_X x^* + 2\tilde{l}_Y y^*}{\tilde{l}_X + 2\tilde{l}_Y}.$$

where $\tilde{l}_J = l_J \gamma_J$. This reveals that the policy proposal of lobbyist X is a weighted average between its own optimal policy and that of the opposing lobbyist, where the weight of the opposing lobbyist is reflected by the hurdle factor, here $h = 2$. As $F_X(t)$ is strictly concave, x is the unique maximizer. Further $F_X'(s) < 0$ implies that x yields higher utility than the status quo.

Now suppose that $\tau_Y^a \neq \emptyset$. For all proposals $t \in \tau_Y$, lobbyist X would be the second mover and thus will not make bribes in equilibrium. The total utility gain of X relative to the status quo is $V_X = l_X v_X(t)$, which is strictly negative for all $t \in \tau_Y$. Hence, if $\tau_Y^a \neq \emptyset$, X will propose s. By symmetry, we obtain the respective choices for lobbyist Y. We summarize our observations in the following proposition:

Proposition 3 (Lobbyists' proposals)
Given the power to craft the policy proposal, lobbyist $J \in \{X, Y\}$ introduces

$$j \;=\; \begin{cases} \frac{\tilde{l}_J j^* + 2\tilde{l}_K t_K^*}{\tilde{l}_J + 2\tilde{l}_K}, & \text{if } \tau_J^a \neq \emptyset, J \neq K, \\ s, & \text{else.} \end{cases}$$

4.2.2 Proposal by the committee

Now we assume that the proposal is determined by the median legislator of a committee, we also refer to him as the chair of the committee.[14] We denote the committee chair's bliss point by c^* which is supposed to be in the interior of τ.[15] Without any lobbying we can infer from (1) that the status quo will prevail. To examine the influence of vote-buying in the legislature on the committee's proposal suppose that $\tau_X^a \neq \emptyset$. By choosing a proposal $t \in \tau_X^a$, the committee's median legislator maximizes $V_c(t) = \alpha\, v_c(t) + b(t) = \alpha v_c(t) - 2\frac{l_Y}{N} v_Y(t)$. In contrast to the lobbies' objective function, the objective of the committee's median legislator is not necessarily concave. $V_c(t)$ is the sum of a concave function $\alpha v_c(t)$ and a convex function $-2\frac{l_Y}{N} v_Y(t)$. Whether $V_c(t)$ is convex or concave ultimately depends on the weights given to the concave (α) and the convex part ($2\frac{l_Y}{N}$) as well as the particular shape of the functions $v_c(t)$ and $v_Y(t)$. Using the quadratic utility functions as specified earlier, we find that $V_c(t)$ is concave if and only if $\alpha\gamma_c\, N > 2\, l_K \gamma_K$. In this case, solving the first-order condition

$$\tilde{\alpha}(t - c^*) - \frac{2\tilde{l}_Y}{N}(t - y^*) = 0 \tag{7}$$

yields the following candidate for the proposal:

$$c_x = \frac{\tilde{\alpha} N c^* - 2\tilde{l}_Y y^*}{\tilde{\alpha} N - 2\tilde{l}_Y}. \tag{8}$$

where $\tilde{\alpha} = \alpha\gamma_c$.[16] Finally we need to check whether c_x is in τ_X^a. If this is not the case the boundary of the implementable set closest to c_x will be the committee's proposal. Further we can observe from the first-order condition (7) that if $\tilde{\alpha}\, N \leq 2\, \tilde{l}_K$, the

[14] Here we assume that the committee chair determines the proposal so as to maximize his own utility. However, it may also be realistic that the committee chair cares about his fellow party members in the legislature as they have nominated him for the committee. Such an extension would not change our main results qualitatively as long as the party members have sufficiently homogeneous preferences.

[15] One may also think of c^* as reflecting the median preference in the legislature. Such an assumption could be justified by the fact that usually the committees of the U.S.-Congress reflect the legislature's proportion of party membership.

[16] Recall that $\tilde{l}_J = l_J \gamma_J$.

left hand side is strictly negative for all $t \in \tau_X^a$.[17] This implies that $V_c(t)$ is strictly decreasing in τ_X^a and hence the optimal proposal is $\min \tau_X^a$. By symmetry the same lines of argument apply to the case where $\tau_Y^a \neq \emptyset$. The following proposition summarizes the results formally:[18]

Proposition 4 (Committee proposal)
Suppose that $\tau_J^a \neq \emptyset$, $J \in \{X, Y\}$. The median legislator's objective function $V_c(t)$ is concave on τ_J^a if and only if $\tilde{\alpha}\, N > 2\, \tilde{l}_K$, $k \in \{X, Y\}$, $k \neq j$.

(i) If $N\tilde{\alpha} > 2\tilde{l}_K$, the committee's best proposal is

$$c = \begin{cases} \min\left\{\max\{c_x, \min \tau_X^a\}, s\right\}, & \text{if } \tau_X^a \neq \emptyset, \\ \max\left\{\min\{c_y, \max \tau_Y^a\}, s\right\}, & \text{if } \tau_Y^a \neq \emptyset, \\ s, & \text{else.} \end{cases}$$

where c_x is defined by (8) and, by symmetry, $c_y = \frac{\tilde{\alpha}\, N\, c^* - 2\, \tilde{l}_X\, x^*}{\tilde{\alpha}\, N - 2\, \tilde{l}_X}$.

(ii) If $\tilde{\alpha}\, N \leq 2\, \tilde{l}_K$, the committee's best proposal is

$$c = \begin{cases} \min \tau_X^a, & \text{if } \tau_X^a \neq \emptyset, \\ \max \tau_Y^a, & \text{if } \tau_Y^a \neq \emptyset, \\ s, & \text{else.} \end{cases}$$

Intuitively, Proposition 4 can be interpreted as follows: If the salience of the issue which reflects the weight on the concave part of the legislator's objective, is sufficiently high, the objective of the legislator is concave. However, the bribes being the second summand in the legislator's objective are convex and increasing the further away the policy proposal from the status quo. Hence if the salience of the issue is low or $\tilde{l}_Y/N$ is high, this second part of the objective function dominates inducing the legislator to propose the most extreme policy within the implementable set. Note that $\min \tau_X^a$ is defined by $F_X(t) = 0$. This implies that $V_X(c) = 0$, i.e. the legislators are skimming off the entire utility gain of lobbyist X from having a policy closer to its ideal. Further it is worth noting that if the objective function is convex, the committee's proposal will be independent of the median legislator's ideal policy.[19] More formally, we obtain:

Corollary 2

(i) If $\tau_X^a \neq \emptyset$ and $c^* < \min \tau_X^a$, then c is monotonically increasing with α.

[17] Recall that $c^* < y^*$ by assumption.
[18] A formal proof of the proposition will be provided upon request.
[19] At least as long as $c^* < y^*$, which we assume throughout the paper.

(ii) There exists a unique threshold level α_b such that for all $\alpha \leq \alpha_b$, $c = \min \tau_X^a$ and for all $\alpha > \alpha_b$, $c > \min \tau_X^a$.

(iii) This result applies for $\tau_Y^a \neq \emptyset$ in a symmetric way.

The proof can be found in the appendix. From Corollary 2 we can directly infer that if salience is low enough, the committee's proposal for policy change is more extreme than the one of the pro-change lobbyists. In the next proposition, we provide a detailed comparison of the proposals.

Proposition 5 (Comparison of proposals)

(i) Let $\emptyset \neq \tau_X^a \subsetneq \tau_X$, and $\tilde{\alpha}N > 2\tilde{l_Y}$. Then $c < x$ if and only if

$$c^* < \underbrace{\frac{\tilde{l}_X x^* + 2\tilde{l}_Y y^*}{\tilde{l}_X + 2\tilde{l}_Y}}_{x} + \frac{2\tilde{l}_Y}{\tilde{\alpha}S} \frac{\tilde{l}_X}{\tilde{l}_X + 2\tilde{l}_Y}(y^* - x^*). \tag{9}$$

(ii) Let $\emptyset \neq \tau_Y^a \subsetneq \tau_Y$, and $\tilde{\alpha}N > 2\tilde{l_X}$. Then $c > y$ if and only if

$$c^* > \underbrace{\frac{\tilde{l}_Y y^* + 2\tilde{l}_X x^*}{\tilde{l}_Y + 2\tilde{l}_X}}_{y} - \frac{2\tilde{l}_X}{\tilde{\alpha}S} \frac{\tilde{l}_Y}{\tilde{l}_Y + 2\tilde{l}_X}(y^* - x^*).$$

(iii) If $|c^* - s| < |j - s|$, then there exists a unique $\tilde{\alpha}_c$ such that for all $\tilde{\alpha} > \tilde{\alpha}_c$, c is closer to s than J and for all $\tilde{\alpha} < \tilde{\alpha}_c$, c is more extreme than J.

For the situation where $\tau_X \neq \emptyset$, condition (9) reveals that the committee may initiate greater policy change than lobbyist X even if the ideal policy of the median legislator in the committee is closer to the status quo than the pro-change lobbyist's optimal policy proposal. It is also possible that c^* is larger than the status quo but the committee's policy proposal is lower than the one of the lobbyist with policy preference x^*. Item (ii) of Proposition 5 depicts the symmetric case where $\tau_Y \neq \emptyset$.

The general intuition for why the legislators may choose more extreme proposals than the lobbyists seeking for policy change is that the strength of the lobbyist opposing policy change enters the objective of the legislator as a benefit but it enters the objective of the first-moving lobbyist as a cost. Hence, the farther away the policy proposal from the status quo, the higher the willingness to lobby against the policy change by the lobbyist defending the status quo. This increases the payments that are necessary for the pro-change lobbyist to outcompete the opposing lobbyist in the lobbying subgame.

But at the same time, these payments benefit the legislators. Due to the concave utility functions, the necessary payments are convex on τ^I. Consequently, moving the proposal closer to its ideal policy implies diminishing marginal benefits and increasing marginal costs for the lobbyist seeking policy change. In contrast it means increasing marginal costs and increasing marginal benefits for the legislator.[20] The latter provides the incentive for the median legislator in the committee to craft extreme proposals. As the convexity of the payments drives the legislator's proposal away from his ideal point, how extreme the policy proposal will be depends on the weight $\tilde{\alpha}$ attached to the concave part of his objective. The higher the salience of the issue the (weakly) closer the committee's proposal to its ideal policy c^*. Proposition 5 states that there is a unique salience threshold above which the committee's proposal will be more moderate than that of the lobbyist seeking policy change. In essence this is a consequence of Corollary 2.

As mentioned in the introduction, the measure of salience α can also be interpreted as a measure of institutional quality. Multiplying $V_c(t)$ by $\frac{1}{\alpha}$ yields $\bar{V}_c(t) = v_c(t) + \frac{1}{\alpha}b(t)$. If vote-selling by the legislators is illegal we can interprete $\frac{1}{\alpha}$ as the probability that taking payments for a vote is not discovered.[21] Further assume that if discovered the bribes are taken away as a punishment. Then we obtain that for $\alpha \to \infty$ the legislator would strictly adhere to his policy preferences and for $\alpha \to 1$ that bribes play a strong role as taking payments is not discovered for sure. Hence all our results on the effect of salience on policy outcomes could also be interpreted as results on the role of institutional differences on policy choices.

5 Status quo differs from median preference in legislature ($s \neq m$)

Now we examine the situation where the ideal policy of the median in the legislature does not coincide with the status quo. Without loss of generality, we assume that

[20] To be precise, it depends on the legislator's ideal policy. It may well be that costs are negative if the policy proposal moves closer to its ideal. However, assuming that the legislators' ideal points are more moderate than the ones of the lobbyists and that the implementable set of policies under consideration τ^I is sufficiently large, the statement in the text will hold for policies sufficiently distant from the status quo.

[21] Perotti and Volpin (2003) consider a similar utility function of legislators. They interpret the corresponding parameter (to α in our paper) as a "measure of actual democracy". They argue that "as the political system beconomes more democratic politicians become more 'accountable' to voters, and α increases"(Perotti and Volpin, 2003, p.10).

$m > s$. This implies that all proposals in $[s, 2m - s] \subseteq \tau_Y$ will be approved by the legislature if no lobbying occurs. Consequently, for these proposals Y would be the second mover in the lobbying subgame. This is the important difference with respect to the case $m = s$ where Y had to move first in support of a proposal $t \in \tau_Y$. To highlight this difference, we assume that $m \geq \frac{y^*+s}{2}$.[22] This ensures that lobbyist Y is the second mover for all proposals in the set τ_Y rather than for only a subset of it.

5.1 Partition of the policy space when $m > s$

Since now X will be the first mover in the lobbying subgame for any policy proposal in τ, a proposal $t \in \tau_Y$ can be implemented if the budget of X does not suffice to craft a legislative majority against it.[23] As a consequence, it is sufficient to consider $F_X(t)$ as given by (5) to characterize the (non-)implementable sets. That is, a policy t is implementable if and only if $F_X(t) \geq 0$. The implementable policy subsets within each of the sets τ_I are defined by $\tau_I^I := \{t \in \tau_I : F_X(t) \geq 0\}$. Similarly to Proposition 2, the partition of the policy space can be characterized as follows:

Proposition 6

(i) If $F'_X(s) > 0$ and $F(y^*) \geq 0$, then $\tau_Y^a = \tau_Y$ and $\tau_X^{\neg a} = \tau_X$

(ii) If $F'_X(s) > 0$ and $F(y^*) < 0$, then $\tau_Y^a = (s, \hat{y}]$, $\tau_Y^{\neg a} = (\hat{y}, y^*]$ and $\tau_X^{\neg a} = \tau_X$, where $\hat{y} \neq s$ and $F(\hat{y}) = 0$.

(iii) If $F'_X(s) = 0$, only the status quo is implementable.

(iv) If $F'_X(s) < 0$ and $F(x^*) < 0$, then $\tau_Y^{\neg a} = \tau_Y$, $\tau_X^a = [\hat{x}, s)$ and $\tau_X^{\neg a} = [x^*, \hat{x})$, where $\hat{x} \neq s$ and $F(\hat{x}) = 0$.

(v) If $F'_X(s) < 0$ and $F_X(x^*) \geq 0$, it follows that $\tau_Y^{\neg a} = \tau_Y$ and $\tau_X^a = \tau_X$.

The proof can be found in the appendix. The intuition of Proposition 2 carries over to Proposition 6 except that now only $F_X(t)$ has to be considered. From Proposition 6 we also obtain a corollary similar to corollary 1.

[22] The condition is equivalent to $v_m(y^*) \geq 0$.

[23] Recall that in the situation where $m = s$ lobbyist Y had to move first in order to craft a majority of the legislature in favor of a proposal $t \in \tau_Y$. Due to a hurdle factor of $h = 2$, this requires higher payments.

Corollary 3
The set of implementable policies will never comprise both, policies favoring X and policies favoring Y.
Formally: if $F'_X(s) \neq 0$, then $\tau_Y^a = \emptyset \Leftrightarrow \neg(\tau_X^a = \emptyset)$.

Having characterized the partition of the policy space, we will now examine the desired policy proposals of the lobbyists and the committee.

5.2 Policy proposals when $m > s$

Other than the status quo, a policy proposal may belong to either of the sets $\tau_X^{\neg a}$, τ_X^I, $\tau_Y^{\neg a}$, and τ_Y^a. First, consider the case of a non-implementable proposal favoring lobbyist X, i.e. $t \in \tau_X^{\neg a}$. There the status quo remains in place and neither of the lobbyists makes any payments. Hence we obtain:

Lemma 2
Neither legislators nor lobbyists will gain in utility relative to the status quo by proposing $t \in x^{\neg I}$.

In the case that τ_X^a is not empty, an implementable proposal favoring X implies – besides a policy change – payments to the legislators by the first-mover lobbyist X. Consequently, when considering potential proposals in τ_X the situation where $m > s$ does not differ from the case where $m = s$.

The difference comes with respect to proposals from the set τ_Y. Suppose that $\tau_Y^a \neq \emptyset$. A proposal $t \in \tau_Y^a$ will be implemented without any payments by the lobbyists. The reason is that for all proposals $t \in \tau_Y^a$ the budget of X is too small to form a majority in the legislature against the bill and thus X abstains from making payments. Lobbyist Y who is in favor of the policy change knows that the majority of the legislators will approve the bill without bribes and consequently does not make any payments either.[24]

In contrast to the situation where $m = s$, when $m > s$ it may be lucrative for a legislator to propose a non-implementable policy of the set τ_Y. For a non-implementable proposal $t \in \tau_Y^{\neg a}$, the first-mover lobbyist X, who opposes the policy change, is strong enough to outcompete Y, who favors the proposal. Hence X will offer payments to the legislators to form a super-majority against the proposal (and Y abstains as it has no chance of

[24]Recall that in the situation where $m = s$, Y had to move first in the lobbying subgame and spend "money" to form a legislative majority in favor of a proposal $t \in \tau_Y^a$.

countering X's payment offers). However the bribes for the legislators are a cost for lobbyist X. Thus, a non-implementable proposal favoring Y only bears costs for X and – relative to the status quo – brings no benefits in terms of policy. For lobbyist Y a non-implementable proposal is neutral as in equilibrium he does not make payments. Hence we can summarize:

Lemma 3

Suppose that $m > s$. Having the power to make the proposal, the lobbyists will propose implementable policies. In contrast, the committee might also introduce a non-implementable policy $t > s$.

Next we study the optimal proposals in more detail.

5.2.1 The lobbyists' proposals when $m > s$

According to Lemma 3, we can restrict our focus to the implementable set of policies when looking for the optimal proposals of the lobbyists. Suppose $\tau_X^a \neq \emptyset$. In this case, X chooses a proposal $t \in \tau_X^a \cup s$ so as to maximize $V_X(t) = l_X v_X(t) + 2l_Y v_Y(t) = F_X(t)$, whereas Y's objective reads $V_Y(t) = l_Y v_Y(t)$. A comparison with section 4.2.1 reveals that the optimization problems of the lobbyists X and Y are identical to the situation $\tau_X^a \neq \emptyset$ when $m = s$.

In the case where $\tau_Y^a \neq \emptyset$ the lobbyists' objectives are $V_J(t) = l_J v_J(t)$, $J \in \{X, Y\}$, since no payments will be made in equilibrium. Lobbyist X will propose the status quo as $V_X(t)$ is negative for all $t \in \tau_Y^a$. By contrast $V_Y(t)$ is positive and increasing on the interval τ_Y^a. Hence, Y's optimal proposal is $\max \tau_Y^a$.

Proposition 7

If $m > s$, the lobbyists' optimal proposals are:

$$x = \begin{cases} \frac{l_X x^* + 2l_Y y^*}{l_X + 2l_Y}, & \text{if } \tau_X^a \neq \emptyset, \\ s, & \text{else.} \end{cases}$$

$$y = \begin{cases} \max \tau_Y^a, & \text{if } \tau_Y^a \neq \emptyset, \\ s, & \text{else.} \end{cases}$$

5.2.2 The committee's proposal when $m > s$

To determine the optimal proposal of the median legislator in the committee, we will again distinguish the cases where $\tau_X^a \neq \emptyset$ and $\tau_Y^a \neq \emptyset$.[25]

Let us start with the case where $\tau_X^a \neq \emptyset$. The only difference to the corresponding case when $m = s$ is that proposing a non-implementable policy from the set τ_Y involves a positive utility gain. Since the bribes $b(t) = \frac{2l_Y}{N}|v_Y(t)|$ are increasing on $\tau_Y^{\neg a}$, y^* yields the highest payments. As a consequence, $c_x := \arg\max_{t \in \tau_X \cup s} V_c(t) = \alpha v_c(t) - \frac{2l_Y}{N} v_Y(t)$, which is identical to c as given in Proposition 4, will be introduced only if $V_c(c_x) \geq V_c(y^*) = b(y^*)$ and y^* otherwise. This is the content of the following proposition:

Proposition 8
Suppose that $\tau_X^a \neq \emptyset$. Then the committee's optimal proposal is

$$c = \begin{cases} c_x, & \text{if } V_c(c_x) \geq V_c(y^*), \\ y^*, & \text{else.} \end{cases}$$

Now we examine the case where $\tau_Y^a \neq \emptyset$. First, additionally assume that $\tau_Y^a \subsetneq \tau_Y$. On the one hand, the legislator could again earn $V_c(y^*) = b(y^*) = \frac{2l_Y}{N} v_Y(y^*)$ by proposing the non-implementable policy y^*. On the other hand, he can choose his most preferred policy within the implementable set τ_Y^a. This policy maximizes $V_c(t) = \alpha\, v_c(t)$ on τ_Y^a and is characterized by

$$c_y = \begin{cases} c^*, & \text{if } c^* \in \tau_Y^a, \\ \max \tau_Y^a, & \text{if } c^* \notin \tau_Y^a \text{ and } c^* > s, \\ s, & \text{else.} \end{cases}$$

Similar to the earlier case where $\tau_X^a \neq \emptyset$, c_y will be introduced if and only if $V_c(c_y) \geq V_c(y^*)$ and y^* otherwise. Note that the condition $V_c(c_y) \geq V_c(y^*)$ can be written as $\alpha v_c(c_y) - \frac{2\,l_Y}{N} v_Y(y^*) \geq 0$. This reveals that there exists a unique threshold for salience α which when exceeded leads the committee to propose c_y. Otherwise the committee will propose the non-implementable policy y^*.

Finally if $\tau_Y^a = \tau_Y$ no policy proposal is associated with bribes and the committee proposes $c = \arg\max_{t \in \tau_Y \cup s} V_c(t) = \alpha\, v_c(t)$. Due to the assumption $c^* < y^*$, the proposal either reflects the median legislator's ideal policy or is equal to the status quo. We summarize our results for the case $\tau_Y^a \neq \emptyset$ in the next proposition:

[25] We neglect the situation where $\tau_X^a = \tau_Y^a = \emptyset$. Trivially, in this case the status quo remains.

Proposition 9

(i) Suppose that $\emptyset \neq \tau_Y^a \subsetneq \tau_Y$. *Then the committee's optimal proposal is*

$$c = \begin{cases} c_y, & \text{if } V_c(c_y) \geq V_c(y^*), \\ y^*, & \text{else.} \end{cases}$$

(ii) If $\tau_Y^a = \tau_Y$, *the committee proposes*

$$c = \begin{cases} c^*, & \text{if } c^* > s, \\ s, & \text{else.} \end{cases}$$

Next we compare the proposals of the lobbyists and the one of the committee. In case that $\tau_X^a \neq \emptyset$, the comparison of the proposals of the lobbyists and the committee only differs from the corresponding case when $m = s$ by the fact that the non-implementable proposal y^* yields a positive utility gain to the median legislator in the committee. Hence, the committee's proposal will always differ from the status quo. Further, even though the committee makes the extreme policy proposal y^*, the status quo will remain in place. Hence, if the median preference in the legislature does not coincide with the status quo, an extreme proposal by the committee will not necessarily involve an extreme policy change. It further follows that relative to the situation where $m = s$, a policy change towards X is less likely if the status quo is closer to X's ideal policy than the bliss point of the median in the legislature, i.e. $m > s$.

When $\tau_Y^a \neq \emptyset$ and the salience of the issue is relatively low we will observe the extreme policy proposal pro Y that does not involve a policy change. In contrast, if the salience of the issue is high, then the committee's policy proposal is equal to or more moderate than the one of lobbyist Y and it is implementable which follows from Lemma 3. In fact, if $c^* \in \tau_Y^a$ the median preference of the committee c^* is implemented without any payments in equilibrium. Given $c^* \in [s, 2m - s]$, this case is identical to the situation without any lobbying as described by (1). However, even though virtually no lobbying is observed in equilibrium, the potential to lobby is still important as it sustains this outcome.

6 Efficiency and welfare

A prevalent question in the literature is whether lobbying leads to efficient outcomes respectively whether it improves welfare. In our model, lobbying does generally not lead to Pareto-improvements as the lobbyists' payments accrue to the legislators and are not used to compensate the losing lobbyist.

In the following we examine how our results can be interpreted in light of a utilitarian welfare measure that sums the utilities of all individuals in society. Let's consider the following simple setting. A society consists of three groups of individuals: the groups X and Y with ideal points y^* and x^* and the "moderate" individuals, group Z, with ideal policy z^*, where $y^* < z^* < x^*$. We assume that the groups X, Y, are of equal size $L_X = L_Y$ and organized in interest groups of sizes l_X and l_Y. The moderate group possesses a very small size of measure L_Z close to (equal to) zero, such that we can neglect this group in the welfare measure.[26] The legislators also belong to either of the three groups. So total welfare can be expressed as $W(t) = L_X V_X(t) + L_Y V_Y(t) + L_Z V_Z(t) \approx L_X V_X(t) + L_Y V_Y(t)$. Further we assume that the distribution of seats in the legislature reflects the population shares. That is, (almost) half of the legislators have preferences aligned with group X and the same measure of legislators have preferences aligned with Y. The median legislator belongs to the moderate group. This implies that $m = z^*$. Further suppose that the preferences of the median legislator in the committee are identical to those of the median in the legislature. Hence, m will be the policy outcome without any lobbying. When not explicitly stated otherwise, we assume in this section that all social groups are proportionally organized into interest groups. In our context, this means that $l_J = \delta L_J$, $J \in \{X, Y\}$.[27] The parameter δ can be interpreted as a measure of how well a social group managed to overcome its collective action problem in forming a lobby. We say that all groups are *proportionally organized* if the same value of δ applies to all groups such that the relative strengths of the lobbies reflect their relative population shares. Again the interest groups are represented by lobbyists X and Y. Before we determine the welfare maximizing policy proposal, note that 'money'-transfers are neutral for welfare as they enter the utility functions linearly. Hence, the welfare effect only depends on the utility changes induced by the policy change. Maximizing this reduced welfare functional $\bar{W}(t) = \delta^{-1}(\tilde{l}_X v_X(t) + \tilde{l}_Y v_Y(t))$ yields the socially optimal policy

$$w = \frac{\tilde{l}_X x^* + \tilde{l}_Y y^*}{\tilde{l}_X + \tilde{l}_Y}.$$

As a first result, we obtain that if the status quo policy coincides with the social optimum no lobbyist will be able to initiate a policy change towards its own ideal point. In this sense the optimal policy is stable if all groups are proportionally organized.

[26] Formally, there is a finite number of moderates in society, which possesses measure zero.

[27] We neglect $l_Z = \delta L_Z$, as L_Z is zero.

Proposition 10

If $s = w$, then $\tau_X^a = \tau_Y^a = \emptyset$.

A proof of the proposition can be found in the appendix. It is now interesting which policy outcomes we can expect if the status quo differs from the social optimum. Since in the example that population shares are given, different values of $\tilde{l}_J$ may result from different intensities of the preferences γ_J. In principle three cases may occur: First, the median preference in the legislature corresponds to the status quo but not to the social optimum, $m = s \neq w$. Second, the median legislator's ideal policy and the welfare maximizing policy are on the same side of the status quo. For the purpose of illustration we choose, $m, w < s$.[28] Third, the median legislator's ideal policy and the welfare maximizing policy are on different sides of the status quo. W.l.o.g. we choose, $m < s < w$.

We start with the situation where $m = s \neq w$. Of course this case is only interesting if the implementable policy set is non-empty. Suppose that $\tau_X^a \neq \emptyset$.[29] The results apply to the situation $\tau_Y^a \neq \emptyset$ in a symmetric way. According to Proposition 3, lobbyist X will propose

$$x = \frac{\tilde{l}_X x^* + 2\tilde{l}_Y y^*}{\tilde{l}_X + 2\tilde{l}_Y},$$

and from Proposition 4 and Corollary 2, we obtain for the committee's proposal when salience is below α_b

$$c = \min \tau_X^a = \max \left\{ 2\frac{\tilde{l}_X x^* + 2\tilde{l}_Y y^*}{\tilde{l}_X + 2\tilde{l}_Y} - s, x^* \right\} = \max\{2x - s, x^*\}.$$

When salience is higher than α_b the committee will propose

$$c = \frac{\tilde{\alpha} N c^* - 2\tilde{l}_Y y^*}{\tilde{\alpha} N - 2\tilde{l}_Y}.$$

Comparing the proposal of lobbyist X with the socially optimal proposal reveals that $w < x$. This means that counter to first intuition, the socially optimal policy is closer to X's ideal point than the policy proposed by lobbyist X himself. The reason is that the costs of moving the proposal further towards x^* increase by a factor two stronger for lobbyist X than for the social planner.[30] This factor reflects the hurdle factor for

[28] Note that we do neither require $m = w$ nor exclude it.

[29] This situation occurs for example if $m = s$ is right in the middle of the interval $[y^*, x^*]$ and the intensity of the preferences of lobbyist X, γ_X, is substiantially stronger than the one of Y (more precisely, $\gamma_X > 2\gamma_Y$).

[30] This can be directly seen from the objective functions of lobbyist X and the social planner.

the first-mover lobbyist, which has to build a pre-emptive supermajority to outcompete the second mover.[31]

From Proposition 5 we know that if salience is lower than α_c, the policy change proposed by the median legislator is more extreme than the one by lobbyist X. Interestingly, this implies that proposal c leads to higher welfare than the proposal of X as long as the committee's proposal is not too extreme. This follows from the fact that w is also closer to x^* than x. Formally the condition $x > c^* > 2w - x$ ensures that the committee proposal is closer to the social optimum than x.[32] In the case of very low salience the committee proposes $\min \tau_X^a$. If $w \leq \min \tau_X^a$, the committee's proposal is the best implementable proposal from a welfare perspective. Interestingly, in this case the welfare maximizing behavior of the median legislator is purely driven by the desire to maximize bribes. Moreover, the lobbyist (X) whose direct utility from policy is strongly represented in the social optimum will be worse off by the socially optimal proposal relative to its own more moderate one. This finding results from the fact that 'money' is neutral in the welfare function. Hence, whether X has to pay high bribes to get the socially optimal proposal implemented does not play a role for the utilitarian social planner.[33]

If the salience of the issue is higher than α_c, the median legislator in the committee will not move the proposal farther away from his ideal point than x as e.g. his constituency may punish him in the next election. Therefore, welfare will be higher if lobbyist X crafts the proposal rather than the committee. The next proposition summarizes our results.

Proposition 11
If $m = s \neq w$ and $\tau_X^a \neq \emptyset$, then

(i) the socially optimal policy is closer to X's ideal point than the proposal of lobbyist X, i.e. $w < x$.

(ii) the committee's proposal c involves higher welfare than the one of lobbyist X if

[31] Diermeier and Myerson (1999) argue that the legislators in the U.S.-Congress have an incentive to organize the political process in a way that leads to a relatively high hurdle factor as this increases the bribes they receive. An interesting aside with respect to our study is that the higher the hurdle factor the stronger the difference between the proposal of the first-mover lobbyist and the socially optimal proposal.

[32] This statement is verified in the proof of Proposition 11.

[33] The social planner could of course redistribute the money to make everyone better off.

and only if

$$2w - x < c < x, \tag{10}$$

(iii) Condition (10) *may only hold if the issue is sufficiently obscure.*

The results for $\tau_Y^a \neq \emptyset$ *are symmetric to the ones for* $\tau_X^a \neq \emptyset$.

A proof is provided in the appendix. So far, the welfare analysis suggests that if the interests in society are proportionally organized into interest groups the median legislator's proposal tends to improve welfare more relative to the proposal of X when the issue is characterized by low salience. By contrast, the opposite is true if salience is sufficiently high. Of course the results may change if the different interests in society are organized at different levels. For example, if the median legislator's ideal policy is close to the social optimum, the extreme proposal of the committee when salience is low bears substiantial welfare losses. In this case, it would be better if the first-mover lobbyist had the power to make the proposal. With high salience, however, the median legislator's proposal involves higher welfare than that of lobbyist X.

Let us now consider the situation where the median legislator's ideal policy and the welfare optimum differ from the status quo policy but are on the same side of status quo, i.e. $m, w < s$. As we show in the next proposition, this implies that $\tau_Y^a = \emptyset$ and $\tau_X^a \neq \emptyset$. One could think of a situation where interest X has only recently been able to overcome its collective action problem. Before, Y had been able to move policy away from the social optimum towards its own ideal policy. Additionally we assume that $m \leq \frac{x^*+s}{2}$.

According to Proposition 7, lobbyist X would introduce[34]

$$x = \min \tau_X^a = 2\frac{\tilde{l}_Y y^* + 2\tilde{l}_X x^*}{\tilde{l}_Y + 2\tilde{l}_X} - s.$$

From Proposition 9 we infer that if $\tau_X^a \neq \tau_X$ and salience is low, the committee will propose the non-implementable policy x^* even though its ideal policy may be implementable. We obtain the following results:

Proposition 12
If $m, w < s$ *and* $m \leq \frac{x^*+s}{2}$, *then*

(i) $\tau_X^a \neq \emptyset$,

[34]Note that the indices have to be exchanged to directly apply the result of the proposition.

(ii) $x < w$,

(iii) *the committee's proposal yields weakly higher welfare than the proposal of lobbyist* X.

A proof can be found in the appendix. In contrast to the case where $m = s$, x is now closer to x^* than w. This result originates from the fact that if $m < s$, proposing a policy from τ_X^a involves no costs for X as the legislature favors any proposal in τ_X^a over the status quo. Further, the higher the hurdle factor for the first-mover lobbyist Y the more extreme the proposal of X will be. The reason is that τ_X^a expands as it becomes harder for X to win the lobbying game. As shown in the proof of Proposition 12, in the situation where both m and w are smaller than the status quo, the policy change proposed by lobbyist X is so extreme that keeping the status quo in place is always preferable from a welfare perspective. This implies that all policies $t \in \tau_X^a \cup s$ involve at least as high a welfare level as x. Since the committee either proposes a policy $c \in \tau_X^a$ or – if salience is low and $\tau_X^a \subsetneq \tau_X$ – the non-implementable policy x^* which in effect preserves the status quo, the policy resulting from the committee's proposal involves at least the welfare level of the proposal of the pro-change lobbyist X. Note that the results are again symmetric in the case that $m, w > s$.

Finally consider the situation where $m < s < w$. Additionally assume that $m \leq \frac{x^*+s}{2}$. This case turns out to be a mixture of the two cases discussed previously. If $\tau_X^a \neq \emptyset$, X does not have to pay for a proposal $t \in \tau_X^a$ to be approved by the legislature as $m < s$. Hence, $x = \min \tau_X^a$ and any proposal leading to a policy closer to s involves higher welfare than x. Hence the committee's proposal yields higher welfare than x. If $\tau_Y^a \neq \emptyset$, lobbyist Y has to make payments to the legislators to implement a proposal $t \in \tau_Y^a$ as $m < s$. In effect, Y faces the same situation as if $m = s$. Similarly with respect to the committee's proposal. If salience is very high, it will propose the status quo as $m < s$. When salience is sufficiently low, c will become more extreme than y. The results are summarized in the following proposition:

Proposition 13
Suppose that $m < s < w$.

(i) *If* $\tau_X^a \neq \emptyset$ *and* $m \leq \frac{x^*+s}{2}$, *then the committee's proposal yields weakly higher welfare than the proposal of lobbyist* X.

(ii) *If* $\tau_Y^a \neq \emptyset$, *then*

(a) *the socially optimal policy is closer to Y's ideal point than the proposal of lobbyist Y, i.e.* $w > y$.

(b) *the committee's proposal* c *involves higher welfare than the one of lobbyist* Y *if and only if*

$$2w - y > c > y, \tag{11}$$

(c) *Condition* (11) *may only hold if the issue is sufficiently obscure.*

Again the results are symmetric for the case $m > s > w$ and $m \geq \frac{y^* + s}{2}$.

7 Discussion

In this section we discuss some extensions of the model with respect to the lobbying subgame and the stage where the bill is crafted.

7.1 Different lobbying subgames

The central mathematical property driving our results is that the bribes for the legislators are convex and increasing when moving away from the status quo. This reflects that payments by the winning lobbyist increase with the budget of the losing lobbyist. In this sense the Groseclose and Snyder (1996)-type lobbying subgame that we have used could be interpreted as a vehicle that delivers the mentioned property but other lobbying subgames are also conceivable.

Two recent papers, Dekel et al. (2008) and Dekel et al. (2009), examine a lobbying game where the bidding process does not end at a pre-determined stage. Instead the alternating bidding process ends when two consecutive offers go by without any change in who would win if the game ended in those rounds. In these papers, the results with respect to the total amount and the distribution of payments to the legislators[35] depend on the specifics of the vote-buying model.

If the votes need to be bought via up-front payments or if in the presence of exogenous bidding costs binding promises can be made to the legislators whose voting behavior is observable, then, for each given policy proposal, the lobbyist with the higher budget

[35]Dekel et al. (2008) investigates general elections, so it is the voters that receive bribes. It is possible to reinterpret their model as a legislative lobbying model for a given proposal. In this paper, we will use this interpretation and, hence, speak of legislators rather than voters.

wins the majority at negligible costs.[36] The important point for our discussion is that in this case the legislators' expected payments do not depend on the strength of the losing lobbyist.

This is different if payments to legislators cannot be made contingent on their votes but promises of a lobbyist are fulfilled only if this lobbyist wins.[37] Then the winning lobbyist's total payments to the legislators are slightly higher than the losing lobbyist's budget. Hence, the total amount of payments by the winner increases with the losing lobbyist's budget. However, only legislators with preferences close to the median may obtain payments and the distribution of bribes across the legislators is not uniquely determined.[38]

In the first specification where the payments do not depend on the losing lobbyist's utility, our results would change in the following way: The lobbyist with the higher budget would introduce the implementable policy that is closest to his ideal point. The same applies for the legislator. However, if payments of the winning lobbyist increase with the other lobbyist's budget, then we would likely obtain similar results as in our basic model.[39]

7.2 Lobbying the agenda setter

Up to this point, we have examined an extreme form of lobbying where a lobbyist can craft the proposal at no cost. The point we want to make in this section is that when salience is low, other lobbying subgames where the lobbyists try to influence the committee for a favorable proposal would also make the committee's proposal more moderate relative to the scenario without direct lobby influence. Explicitely modelling an additional lobbying subgame at the proposal stage is beyond the scope of the paper. Our discussion is based on the argument that independent of the specific formulation of the lobbying game at the proposal stage, as long as the committee chair is able to

[36] In Dekel et al. (2009) it is assumed that legislators care about their voting behavior not the outcome of the vote. In this case, the winning lobbyist may have to make compensatory payments in case he possesses a preference-disadvantage.

[37] Additionally, there are no bidding costs.

[38] A similar result should be obtained when vote contingent promises are possible and there are no bidding costs, but the lobbyists have some uncertainty about their opponent's budget. Then the bidding process would be similar to an English auction.

[39] Of course, the legislator who proposes the policy needs to have a sufficiently high probability of receiving bribes. With the assumption that the median legislator makes the proposal as used in basic model the policy proposer has a probability of one to receive payments.

reject all offers by the lobbyists, the utilities derived in our previous analysis define the outside options that need to be overbid by the lobbyists.

Suppose that $\emptyset \neq \tau_X^a \subsetneq \tau_X$, $m \geq s$ and that salience is below α_b. Then $c = \min \tau_X^a$. With this policy proposal the surplus of lobbyist X is zero. As shown earlier, X's most preferred policy proposal is more moderate than c. Even though $x^* < c$, lobbyist X is willing to *actively* support a slightly more moderate proposal than c if $\frac{dV_X(t)}{dt}\Big|_{t=c} > -\frac{dV_c(t)}{dt}\Big|_{t=c}$. In this case X would be able to compensate the committee for the loss in utility from a slightly more moderate policy proposal. Otherwise, X would *passively* support a more moderate proposal, that is X would not counter any attempts of Y to push the proposal towards the status quo as long as the new proposal is still lower than X's ideal proposal x.

Similarly, in the case where $\emptyset \neq \tau_Y^a \subsetneq \tau_Y$, $m > s$ and the non-implementable policy y^* is proposed. Here lobbyist X would prefer any policy $t \in \tau_Y$ with $t < y^*$.[40] This means that lobbyist X would also prefer an implementable pro-Y policy y^a to the non-implementable proposal y^*. This is due to the high payments associated with preventing the implementation of y^*.[41]

As consequence, concerning the proposals $c = \min \tau_X^a$ and $c = y^*$, there is no conflict of interest between the lobbyists with respect to proposing a slightly more moderate policy. Hence, in the cases where the pro-change lobbyist's proposals are more moderate than the ones of the committee, we also expect policies to be more moderate with a different specification of lobbying at the proposal stage.

8 Conclusions

In this paper we have developed a legislative lobbying model to study the effect of lobbying at the stage of crafting the proposal if vote-buying occurs in the legislature. We have compared the scenario where the committee crafts the proposal without direct influence from outside lobbyists with the scenario where the lobbyist seeking policy

[40] This can be verified as follows: X has to make payments of the amount $T_X(y^*) = 2l_Y v_Y(y^*)$ to prevent the implementation of y^*. Since $2l_Y v_Y(y^*) > 2l_Y v_Y(y^a) \geq -l_X\, v_X(y^a)$, for some implementable policy y^a, lobbyist X prefers the proposal y^a to the non-implementable y^*. Note that the last inequality holds because y^a is implementable, i.e. because $F(y^a) = l_X\, v_X(y^a) + 2l_Y v_Y(y^a) \geq 0$.

[41] Note that the payments are the reason for why the policy proposer makes these "extreme" proposals: she exploits the lobbyists' willingness to pay for or against certain policy proposals for her own benefit.

change may write the bill.

One of the key insights is that when salience is low, the committee may introduce policy changes tilted much more towards the ideal policy of the pro-change lobbyist than this lobbyist would propose himself. This is true even though the committee's preferences are more moderate. Hence, in this case lobby influence at the stage of crafting the proposal makes policies more moderate rather than more extreme. As we have discussed the latter should also to hold true for other approaches to model lobbying at the stage of crafting the proposal. On the contrary, if the salience of an issue is high, we obtain the opposite result, i.e. the pro-change lobbyist's proposal is closer to his ideal point than the one of the committee.

According to our welfare analysis, the committee's proposal yields higher levels of welfare than the pro-change lobbyists proposal for medium levels of salience. The committee's proposal can be worse if salience is very high or very low. The intuitive reason for the former is the well known argument that if the committee chair (e.g. the median legislator) cares only about his policy preferences, the outcome does not properly account for the intensity of the utilities of the lobbyists. On the other hand, if salience is very low, the strong rent-seeking behavior of the committee can also lead to lower welfare relative to the lobbyist's proposal. The latter stands in contrast with the results usually obtained in lobbying models based on common-agency frameworks.

The paper offers several avenues for future research. Since we have examined an extreme form of lobbying where the lobbyist can write the bill by himself, it would be interesting to extend the model to reflect weaker cases of influence on the committee when crafting the proposal. One aspect of such an extension has been discussed in Section 7.2. An explicit formulation would yield further interesting insights into the interaction of lobbying the agenda setter and vote-buying in the legislature. It is also interesting to consider a dynamic version of the model. This would allow to study how policies evolve over time and which ones are stable in the long run.

Appendix

A Proofs

A.1 Proof of Proposition 2

A policy $t \in \tau_J$ is implementable if and only if $F_J(t) \geq 0$. Since $F_J(t)$ is strictly concave and possesses one root at s, $F_J'(s)$ indicates on which side of s the function $F_J(t)$ reaches its maximum.

Consider cases (i) and (ii). There $F_Y'(t) > 0$ and hence there exist policies $t \in \tau_Y$ for which $F_Y(t) > 0$. It follows that $\tau_Y^a \neq \emptyset$. Further $F_Y(y) \geq 0$ indicates whether the second root of $F_Y(t)$ is an element of τ. In case that $F_Y(y) > 0$ is satisfied, the second root of $F_Y(t)$ is not an element of τ and consequently $F_Y(t) > 0$ for all $t \in \tau_Y$. If $F_Y(y) > 0$ does not hold, the second root is an element of τ_Y. Denote this root by $\hat{y}$. Then for all $s < t \leq \hat{y}$, $F_Y(t) \geq 0$, and for all $\hat{y} < t \leq y$, $F_Y(t) < 0$.

Now we show that if $F_Y'(s) > 0$, then $\tau_X^a = \emptyset$. First note that if $F_Y'(s) > 0$, then $F_Y(t) < 0$ for all $t \in \tau_X$. Using the definition of the functions $F_J(t)$ as given in (5), we can write

$$F_X(t) = F_Y(t) - B_X(t) - B_Y(t).$$

Hence if follows from $F_Y(t) < 0$ that $F_X(t) < 0$.

By changing indizes, the same reasoning applies to the cases (iv) and (v).

With respect to (iii) we obtain that $\tau_X = \tau_X^{\neg a}$ since $F_X'(s) \leq 0$ and $\tau_Y = \tau_Y^{\neg a}$ since $F_Y'(s) < 0$. Consequently, no policy is implementable other than the status quo policy. □

A.2 Proof of Corollary 2

For the derivative of c_x with respect to $\tilde{\alpha}$, we obtain

$$\frac{\partial c_x}{\partial \alpha} = \frac{2\gamma_c N \tilde{l}_Y (y^* - c^*)}{(\tilde{\alpha} N - 2\tilde{l}_Y)^2} > 0.$$

This together with Proposition 4 implies item (i) that c is monotonically increasing if $\tau_X^a \neq \emptyset$ and $c^* > \min \tau_X^a$.

Now we consider (ii). We have

$$\lim_{\alpha \to \frac{2\tilde{l}_Y}{\gamma_c N}} c_x = -\infty \,, \; \lim_{\alpha \to \infty} c_x = c^* \,.$$

Additionally we know from Proposition 4 (ii) that if $\alpha < \frac{2\tilde{l}_Y}{\gamma_c N}$, $c = \min \tau_X^a$. Hence we can conclude that given $c^* > \min \tau_X^a$, there exists a unique level of α such that for all α equal to or below this threshold $c = \min \tau_X^a$ and $c > \min \tau_X^a$ otherwise.

With respect to (iii) we obtain for the case $\tau_Y^a \neq \emptyset$ and $c^* < \max \tau_Y^a$,

$$\frac{\partial c_y}{\partial \alpha} = \frac{2\gamma_c N \tilde{l}_X (x^* - c^*)}{(\tilde{\alpha} N - 2\tilde{l}_X)^2} < 0.$$

and

$$\lim_{\alpha \to \frac{2\tilde{l}_X}{\gamma_c N}} c_y = \infty \,, \; \lim_{\alpha \to \infty} c_y = c^* \,.$$

Consequently there exists a unique threshold level of α such that for all α equal to or below this threshold $c = \max \tau_Y^a$ and $c < \max \tau_Y^a$ otherwise. □

A.3 Proof of Proposition 6

As stated in the text, if $m > s$, a policy t is implementable if $F_X(t) \geq 0$. Now the proof takes essentially the same arguments as the one of Proposition 2. Condition $F_X'(s) > 0$ indicates that the second root is larger than s and consequently the set of policies for which $F_X(t) \geq 0$ is a subset of τ_Y. In case that $F_X(y) > 0$ is also satisfied, the second root of $F(t)$ is not an element of τ and consequently $F_X(t) > 0$ for all $t \in \tau_Y$. If $F_X(y) \geq 0$ does not hold, the second root is an element of τ_Y. Denote this root by $\hat{y}$. Then for all $s < t \leq \hat{y}$, $F_X(t) \geq 0$, and for all $\hat{y} < t \leq y$, $F_X(t) < 0$. The same reasoning applies for the case $F_X'(s) < 0$ and the condition $F_X(x) \geq 0$. In the special case that $F_X(t)$ reaches its maximum at s, both implementable sets τ_Y^a and τ_X^a are empty. Consequently the status quo will remain in place. □

A.4 Proof of Proposition 10

The welfare optimum is characterized by $\tilde{l}_X v_X'(w) = -\tilde{l}_Y v_Y'(w)$. For $\tau_X^a \neq \emptyset$ we need $F_X'(s) < 0 \Leftrightarrow \tilde{l}_X v_X'(s) + 2\tilde{l}_Y v_Y'(s) < 0$. As by assumption $w = s$, we can use the marginal condition for a welfare optimum to substitute $\tilde{l}_X v_X'(s)$ in the condition for $F_X'(s) < 0$. We obtain $\tilde{l}_Y v_Y'(s) < 0$, which cannot be satisfied. Hence, $\tau_X^a = \emptyset$. By

symmetry, the same line of argument applies to show that condition $F'_Y(s) > 0$ cannot be satisfied if $w = s$. □

A.5 Proof of Proposition 11

Item (i) is clear as the weight on y^* in x is higher than in w.

Consider now item (ii): Since $\bar{W}(t)$ is strictly concave and $w < x$, there is exactly one other policy $\bar{w}$ that yields the same level of welfare as x. $\bar{w}$ is defined by $\bar{W}(\bar{w}) - \bar{W}(x)$, $\bar{w} \neq x$. Solving for $\bar{w}$ gives $\bar{w} = 2w - x$. Due to the concavity of $\bar{W}(t)$ all proposals in the set $(\bar{w}, x)$ involve higher welfare than x. The condition $t \in (\bar{w}, x)$ is equivalent to condition (10).

(iii) If the issue under consideration is highly salient, then c is closer to m than x. Since $w < x$, c will involve lower welfare than x.

It can easily be verified that the results are symmetric in the case $\tau^a_Y \neq \emptyset$. In fact with respect to the optimal proposals only the indices X and Y have to be exchanged. We would then obtain: (i) $w > y$ and (ii) $y < c < 2w - y$. □

A.6 Proof of Proposition 12

(i) If $m, w < s$, then $\tau^a_X \neq \emptyset$ if and only if $F'_Y(s) < 0$. This condition writes

$$l_Y v'_Y(s) + 2l_X v'_X(s) < 0. \tag{12}$$

w is defined by

$$l_Y v'_Y(w) = -l_X v'_X(w). \tag{13}$$

If $w < s$, we have $v'_Y(w) > v'_Y(s)$ and $v'_X(w) > v'_X(s)$. Substituting $v'_Y(s)$ by $v'_Y(w)$ in (12) and using (13), we obtain as a sufficient condition for (12) to hold that

$$l_X v'_X(w) < 0,$$

This condition is satisfied as $x^* < w$ and $v_X(t)$ is concave.

(ii) Define $\underline{\mathrm{w}}$ as the policy that yields the same level of welfare as the status quo, i.e. $\bar{W}(\underline{\mathrm{w}}) = \bar{W}(s)$, $\underline{\mathrm{w}} \neq s$. Obviously $w > \underline{\mathrm{w}}$. Consequently, $x = \min \tau^a_X$ is smaller than w if $x < \underline{\mathrm{w}}$. This condition can be written as

$$x = 2\frac{\tilde{l}_Y y^* + 2\tilde{l}_X x^*}{\tilde{l}_Y + 2\tilde{l}_X} - s < 2\frac{\tilde{l}_Y y^* + \tilde{l}_X x^*}{\tilde{l}_Y + \tilde{l}_X} - s = \underline{\mathrm{w}}$$

Minor mathematical manipulations transform the condition to $x^* < w$. This must be the case as $\tilde{l}_Y \neq 0$.

(iii) The committee either proposes $c \in \tau_X^a$ or $c = x^*$ if $x^* \notin \tau_X^a$, which effectively keeps the status quo policy in place. As a consequence, to verify that the committee's proposal yields weakly higher welfare than the proposal of lobbyist X it is sufficient to show that any policy $t \in \tau_X^a \cup s$ yields higher welfare than $x = \min \tau_X^a$. For this purpose we define by $\bar{w}$ the policy that yields the same level of welfare as x and then show that $\bar{w} > s$ which implies that all $t \in \tau_X^a \cup s$ improve welfare relative to x. The condition $\bar{w} > s$ can be written as

$$\begin{aligned} \bar{w} = 2w - x = 2w - 2\frac{\tilde{l}_Y y^* + 2\tilde{l}_X x^*}{\tilde{l}_Y + 2\tilde{l}_X} + s &> s \\ \Leftrightarrow \frac{\tilde{l}_Y y^* + \tilde{l}_X x^*}{\tilde{l}_Y + \tilde{l}_X} &> \frac{\tilde{l}_Y y^* + 2\tilde{l}_X x^*}{\tilde{l}_Y + 2\tilde{l}_X} \end{aligned}$$

Minor mathematical manipulations reveal that the condition holds if $x^* < w$, which is given as by assumption $\tilde{l}_Y \neq 0$. □

References

David P. Baron. Competitive lobbying and supermajorities in a majority-rule institution. *Scandinavian Journal of Economics*, 108(4):607–642, 2006.

Frank R. Baumgartner, Jeffrey M. Berry, Marie Hojnacki, David C. Kimball, and Beth L. Leech. *Lobbying and Policy Change: Who Wins, Who Loses, and Why*. The University of Chicago Press, Chicago, IL, 2009.

Michel Le Breton and Vera Zaporozhets. Sequential legislative lobbying under political certainty. *The Economic Journal*, 120:281–312, 2009.

Ernesto Dal Bo. Bribing voters. *American Journal of Political Science*, 51(4):789– 803, 2007.

Eddie Dekel, Matthew O. Jackson, and Asher Wolinsky. Vote buying: General elections. *Journal of Political Economy*, 116(2):351–380, 2008.

Eddie Dekel, Matthew O. Jackson, and Asher Wolinsky. Vote buying: Legislatures and lobbying. *Quarterly Journal of Political Science*, 4(2):103–128, 2009.

Daniel Diermeier and Roger B. Myerson. Bicameralism and its consequences for the internal organization of legislatures. *The American Economic Review*, 89(5):1182–1196, 1999.

Tim Groseclose and James M. Snyder. Buying supermajorities. *The American Political Science Review*, 90(2):303–315, 1996.

Elhanan Helpman and Torsten Persson. Lobbying and legislative bargaining. *Advances in Economic Analysis & Policy*, 1, 2001.

Enrico Perotti and Paolo Volpin. The political economy of entry: Lobbying, inequality and financial development. *Working Paper*, 2003.

James M. Snyder. On buying legislatures. *Economics and Politics*, 3:93 –109, 1991.