



## **Discussion Paper Series**

2005 – 04

Department of Economics  
Royal Holloway College  
University of London  
Egham TW20 0EX

©2005 Giovanni Facchini and Cecilia Testa. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit including © notice, is given to the source.

# A Theory of Bicameralism

Giovanni Facchini\*  
Department of Economics  
University of Illinois

Cecilia Testa  
Royal Holloway College  
STICERD – LSE

March 7, 2005

## Abstract

We model the role of a parliament's structure in shaping the accountability of elected representatives. In a setting in which lawmakers interact with a lobby through a bargaining process and with voters by means of elections, we show that only a single legislative body who can make take it or leave it offers to the lobby can be held unambiguously accountable to voters. Whenever the pressure group enjoys some bargaining power, two chambers might instead provide better discipline, depending on the rules governing their interaction, and in particular the allocation of the decision powers among them. We show that bicameralism with restricted amendment rights provides the best incentives, while unrestricted amendment rights result in a status quo bias. Furthermore, by adding complexity of the legislative process, the presence of a second chamber might lead to an undesirable outcome, i.e. a decline in the legislator's bargaining power vis à vis the lobby and a reduction in his accountability. Arguments suggesting that bicameralism is a *panacea* against the abuse of power by elected legislators should therefore be taken with due caution.

*JEL classification: D72, C78*

*Keywords: Lobbying, bargaining, elections, accountability, bicameralism.*

---

\*Corresponding author. Facchini can be reached at the following address: Department of Economics, University of Illinois at Urbana Champaign, 470D Wohlers Hall, MC-706, 1206 S. Sixth St., Champaign, IL 61820. Email: facchini@uiuc.edu. Testa can be reached at the following address: Department of Economics, Royal Holloway College, Egham, Surrey TW20 0EX, United Kingdom. Email: cecilia.testa@rhul.ac.uk. We would like to thank Erik Balder, Tim Besley, Klaus Desmet, Hadi Esfahani, Gilat Levy, Torsten Persson, Matthias Polborn, Andrea Prat and Gerald Willmann for very useful comments.

# 1 Introduction

In modern democracies members of legislative bodies are appointed through popular elections and while in principle parliaments should only serve the interests of the electorate, in practice elected legislators are often subject to other pressures. In particular, organized interest groups commonly offer elected officials money or information in exchange for policy favors. How does *lobbying* affect policy choice? According to a benevolent view, pressure groups convey information on individual preferences, thereby enhancing public decision making. From a more critical perspective, lobbies and citizens might well have conflicting interests and as a consequence of lobby pressures, the legislature might no longer maximize the well being of the citizenry. When *electoral accountability* is at risk, it is natural to ask how citizens can provide incentives to legislators to serve their interests. In other words, how is it possible to increase electoral discipline? The design of political institutions plays a very important role in shaping a government's behavior and might help to prevent the abuse of power by legislators. In this paper we focus on bicameralism, an institutional arrangement common to many democratic countries,<sup>1</sup> and investigate whether the existence of a second legislative body can increase the accountability of elected representatives. In federal countries like the United States, Germany or Canada the existence of two chambers in the Parliament is motivated by the need to represent the interests of the sub-national entities in a separate second body but more generally, the concern for a potential abuse of power provides a very important justification for bicameralism. This intent has been highlighted by Madison (1788):<sup>2</sup>

“It is a misfortune incident to republican government, though in a less degree than to other governments, that those who administer it may forget their obligations to their constituents, and prove unfaithful to their important trust. In this point of view, a senate, as a second branch of the legislative assembly, distinct from, and dividing the power with, a first, must be in all cases a salutary check on the government. It doubles the security to the people, by requiring the concurrence of two distinct bodies in schemes of usurpation or perfidy, where the ambition or corruption of one would otherwise be sufficient.”

---

<sup>1</sup>Half of the OECD countries have two chambers. See Testa (2003a).

<sup>2</sup>*The Federalist* paper 62.

While Madison’s argument has clear, intuitive appeal, the existing empirical evidence does not point out a systematic relationship between the number of chambers in a Parliament and the extent of accountability<sup>3</sup>. To solve this puzzle, we develop what is to the best of our knowledge the first model that combines the analysis of legislative procedures, lobbying and elections. We show that the design of the legislative branch affects the power of electoral incentives (voting) vs. monetary incentives (lobbying), and analyze which rules can increase electoral discipline. As it turns out, when a single legislator and a lobby bargain over the rents generated by the policy, only if the legislator can make take-it-or-leave-it offers, he can always be held accountable to the voters. If his bargaining power is instead limited, there is scope for introducing a second legislative body to promote electoral discipline. The effect of increasing the number of chambers that need to sequentially approve the implementation of a project differs depending on the distribution of powers between them. In particular, we show that for accountability purposes, the best bicameral system is that in which equal decision powers are given to the two chambers. The system that attributes final decision power to the second chamber is instead bad for incentives, since it may generate a *status quo* bias. The system assigning more decision power to the first legislator can instead be ranked between the two previous alternatives. Our analysis also highlights a potential shortcoming of the longer decision-making process associated with multiple legislators, i.e. the possibility that the legislators might lose bargaining power because there is not enough time to engage in negotiations with the lobby. For these reasons, our model provides a useful framework to evaluate the consequences of constitutional reforms altering the powers of legislative bodies, like the ones being planned in Germany, the UK and Italy<sup>4</sup> and suggest an important caveat, i.e. that when multiple chambers do not retain the same power to make counter-offers as a single one, *bicameralism might reduce accountability*.

The framework developed in this paper is closely related to the agency model of political competition (among recent contributions see Banks and Sundaram (1998), Coate and Morris (1995) and Persson, Roland, and Tabellini (1997)) since we study how an elected legislator can adopt choices enhancing his utility at the expense of the voters’ welfare. However, we depart from the standard agency models in several directions. First, instead of a representative

---

<sup>3</sup>See Testa (2003a).

<sup>4</sup>In both Germany and Italy the proposed reform goes in the direction of reducing the power of the senate, while in the UK the proposal to render the Lords an elected body with substantive legislative powers pushes in the opposite direction.

agent, we consider voters and legislators with heterogenous preferences for policies. Hence, rather than bad or good politicians, we have elected lawmakers that can take advantage of their position to enhance their private utility, or refrain to do so because they are interested in winning elections and continue to choose their most preferred policy. Second, we assume that lobbying is the source of the agency problem by explicitly modelling the role of pressure groups. In this sense, our model is related to the literature on public decision making in presence of lobbying and elections (in particular see Grossman and Helpman (1996), Besley and Coate (2001)). However, more fundamentally, and differently from this literature, we ask whether legislative procedures can affect the balance of power between lobbies and voters. Baron and Ferejohn (1989), Groseclose and Snyder (1996), Diermeier and Myerson (1999) and Cardona-Coll and Mancera (2000), among others, consider simultaneously lobbying and legislative procedures. However, research considering the interaction between elections, lobbying and legislation is scant,<sup>5</sup> and by combining these three dimensions, our paper builds a bridge between several streams of existing literature. In doing so, we gain a number of new and important insights on the role of institutions in balancing the interests of voters, who can only interact with legislators by means of periodic elections, and the interests of a minority of agents (lobbies), which can instead use more refined instruments, like monetary transfers, to continuously influence legislators during the law making process.

The remainder of the paper is organized as follows. Section 2 outlines the model and discusses the main assumptions. In section 3 we characterize the equilibrium under unicameralism, while section 4 deals with bicameralism and accountability under both an *open rule* and a *closed rule* setting. Section 5 offers concluding remarks.

## 2 The model

Consider an economy composed of a set  $\{1, \dots, K\}$  of citizens indexed by  $k$ . To keep the analysis simple, we model the interaction between electors  $e$ , legislators  $g$  and lobbies  $l$  as a game lasting for two periods<sup>6</sup>  $t \in \{1, 2\}$ , with  $\delta$  being the discount factor between the two periods. We start by considering the case of a single legislator. The task of the legislator

---

<sup>5</sup>One of the few examples is represented by Denzau and Munger (1986), who study the relationship between voters, lobbies and legislators in a reduced-form model that does not provide micro-foundation for the agents behavior.

<sup>6</sup>In the rest of the paper we will interchange the terms period and mandate.

is the selection of a public project on the behalf of all citizens  $k$ . The lobby  $l$  and the electors  $e$ , interacting with the legislator  $g$ , can influence his project choice. The timing of the game between  $g$ ,  $l$  and  $e$  is as follows. A citizen  $g$ , exogenously appointed to become the first legislator, initiates the legislative process to select a public project in  $t = 1$ . Once the process has been initiated, but before the actual policy choice, the lobby  $l$  can “bribe” the lawmaker to affect his decision. At the end of the first period, citizens observe the implemented project and decide whether to reappoint the incumbent or replace him. At the beginning of the second period, the elected legislator initiates a new process and the lobby  $l$  can again bribe him. A project is then chosen and the game ends. The public project chosen in each period is characterized by two dimensions: cost  $C$  and type  $a$ . The total cost  $C$  is shared by all citizens, who end up paying the a capita cost  $C \in \{C^L, C^H\}$  with  $C^H > C^L = 0$ . The type  $a \in \mathbf{R}^+$  of the policy is an attribute on which individuals have different preferences. As in the citizen-candidate framework (Besley and Coate (1997), Osborne and Slivinski (1996)) we assume that legislators are policy motivated on the type dimension, i.e. they cannot commit to a policy type different from their most preferred one. We denote by  $a_g$  the policy type delivered by legislator  $g$  and  $a_{kg}$  the direct benefit arising to individual  $k$ . Preferences for the policy type are single peaked and  $a_{gg} = \max_k a_{kg}$ . A public project is a triple  $\mathbf{p}^t = (I, C, a_g) \in \mathbf{P}^t$ , where  $\mathbf{P}^t$  is the set of all possible project available at time  $t$ . For simplicity, we will indicate by  $\mathbf{p}_0^t$  the degenerate case in which no project is carried out ( $I = 0$ ). If a project is instead implemented ( $I = 1$ ), its realization is attributed to the firm, owned by a citizen/lobbyist  $l$ , that obtains a net profit  $\pi(C) = [\Pi(C) - C]$  increasing in  $C$ . For simplicity, we assume that  $\Pi(C^L) = C^L$  and that  $\Pi(C^H) > C^H$ , so that the returns can be normalized as follows:  $\pi(C^H) = \pi = constant$  and  $\pi(C^L) = 0$ . We will indicate by  $\mathbf{p}_{g,C}^t$  the project characterized by a cost  $C$  and a type  $a_g$  implemented at time  $t$ .

In the next two sections we consider more in detail the lobbying and the voting stages.

## 2.1 Lobbying

We model the lobbying activity in each period  $t$  as a bargaining game of alternating offers between the lobby and the incumbent legislator. We suppose that during each political mandate  $t$ , negotiation rounds  $r$  take place, with  $r = \{1, \dots, n\}$ , where one player proposes a project and a share of the corresponding rent to the other player, who can either accept or

reject. If no agreement is reached by the end of the mandate  $t$ , given that the legislator can implement any policy independently of the lobby, the disagreement payoffs will be determined by the policy unilaterally chosen by the legislator.

As it seems natural, we assume that the lobby initiates the game by making the first proposal.<sup>7</sup> If the proposal is accepted, the bargaining ends with an agreement, while if the proposal is rejected, the bargaining goes to the next round. In each of the rounds  $r > 1$  a player is randomly assigned the right to make offers. To describe the structure of the game, we illustrate a portion of the extensive form in Figure 1, where  $N$  is nature. Let  $q$  and  $(1 - q)$  respectively be the probability that policy maker  $g$  and lobby group  $l$  make a proposal at each round  $r > 1$ . Both probabilities are common knowledge among the parties and the extreme cases where  $q = 0$  or  $q = 1$  represent the situations in which the lobby or the legislator can make take-it-or-leave-it offers, i.e. one of the parties enjoys all the bargaining power. The assumption of random proposers is made to capture the link between the bargaining power of the legislator and the lobby's ability to influence policies.

Formally, we can describe the bargaining game taking place in stage  $t$  as follows. Denoting  $T_{lg}^t$  a monetary transfer from the lobby  $l$  to the legislator  $g$ , let  $\mathbf{x}_r^t \in \mathbf{X}^t = \{(\mathbf{p}^t, T_{lg}^t) : \pi(I, C) - T_{lg}^t \geq 0\}$  be the offer made in round  $r$  of mandate  $t$  and let  $y_r^t \in \{\text{Yes, No}\}$  be the corresponding reply. A strategy for player  $k$ , where  $k = l, g$ , is a sequence of functions  $\gamma_k^t = \{\gamma_k^{t,r}\}_{r=1}^n$  where  $\gamma_k^{t,r} = (\mathbf{x}_r^t, y_r^t)$  is the  $r$ -th round strategy that, for any history of the game up to round  $r$ , prescribes a proposal  $\mathbf{x}_r^t$  and a response  $y_r^t$  to all possible proposals by other players. The acceptance of a proposal  $\mathbf{x}_r^t$  involves the implementation of a project  $\mathbf{p}^t$  and the payment of the monetary transfer  $T_{lg}^t = \beta_g^t \pi(I, C)$  from lobby  $l$  to legislator  $g$ , where  $\beta_g^t$  is the share of the rents from the project paid to the legislator, while the share retained by the lobby is  $\beta_l^t = 1 - \beta_g^t$ . The corresponding one period payoff  $v_{kg}^t(\cdot)$  of individual  $k$ , with  $k = e, g, l$  can then be written as follows:

$$v_{kg}^t(\mathbf{p}_0^t) = 0 \quad \forall k \tag{1}$$

$$v_{eg}^t(\mathbf{p}_{g,C}^t) = a_{eg} - C \tag{2}$$

$$v_{lg}^t(\mathbf{p}_{g,C}^t, T_{lg}^t) = a_{lg} + (1 - \beta_g^t)\pi \tag{3}$$

$$v_{gg}^t(\mathbf{p}_{g,C}^t, T_{lg}^t) = a_{gg} + \beta_g^t \pi - C \tag{4}$$

---

<sup>7</sup>See footnote 15 for the implications of this assumption.



Throughout the paper we will focus on the situation in which citizens  $e$  and the lobby  $l$  have opposite interests on the policy, i.e.

$$v_{eg}^t(\mathbf{p}_{g,CH}^t) < v_{eg}^t(\mathbf{p}_0^t) < v_{eg}^t(\mathbf{p}_{g,CL}^t) \quad \forall e \neq g \quad (5)$$

$$v_{eg}^t(\mathbf{p}_0^t) < v_{eg}^t(\mathbf{p}_{g,CH}^t) < v_{eg}^t(\mathbf{p}_{g,CL}^t) \quad \forall e = g \quad (6)$$

$$v_{lg}^t(\mathbf{p}_{g,CH}^t, T_{lg}^t(C^H)) > v_{lg}^t(\mathbf{p}_{g,CL}^t, T_{lg}^t(C^L)) > v_{lg}^t(\mathbf{p}_0^t) \quad (7)$$

We are now ready to introduce the voting stage.

## 2.2 Voting

For simplicity we assume that there are only two candidates,  $A$  and  $B$ , drawn from the set of citizens distributed according to their preferences for the policy types  $a$ . We denote by  $m$  the median voter of this distribution<sup>8</sup> and we assume that the two candidates are respectively located to the left and right of the median voter, i.e. they have different preferences for the policy type. Our main objective here is to understand whether the threat of a political rival with different policy preferences can discipline the incumbent in his current policy choice.<sup>9</sup> Candidate  $A$  is exogenously selected to become the first legislator and at the end of the first period his reappointment is challenged by  $B$ . We assume that the candidate receiving the vote of the median voter wins the elections. The median voter decides whether to reappoint the incumbent  $A$  or to replace him with challenger  $B$ , after having observed the policy choice  $\mathbf{p}^1 \in \mathbf{P}^1$ . A strategy for the median voter  $e = m$  consists then in a mapping  $\sigma_m : \mathbf{P}^1 \rightarrow \{0, 1\}$ , where  $\sigma_m = 1$  means that policy maker  $A$  will be reelected by the median voter and  $\sigma_m = 0$  indicates instead that the median voter will support the challenger  $B$ . To avoid the trivial case in which one candidate always wins the elections because he has an absolute advantage in the political race, we assume that if both candidates choose the same cost  $C$ , there is no  $a_A$  and  $a_B$  such that one candidate wins the election. In other words, none of them can win the election on ideological grounds. In the context of our model, voting is deterministic, and for

---

<sup>8</sup>Remember that citizens can be ranked according to their preferences for the policy types because preferences are single peaked.

<sup>9</sup>In other words, we investigate whether non convergence to the median voter has implications for accountability. Although in this paper we do not endogenize the location, there is a vast literature showing the existence of non-convergence equilibria. Among the recent contributions, see Testa (2003a) and Fauli–Oller, Ok, and Ortuno–Ortin (2003).

no candidate to have an advantage on ideological grounds, both must have an equal chance to win the election, i.e. they must be equally distant from the median voter. More formally, denoting by  $|a_{kg} - a_{gg}|$  agent's  $k$  utility loss when  $g \in \{A, B\}$  chooses the policy, we assume that  $|a_{mA} - a_{mm}| = |a_{mB} - a_{mm}|$ . As a result, the political issue that can make a difference is the cost of the project, which becomes the “*politically salient*” characteristic as in Besley and Coate (2003)<sup>10</sup>. Notice that, even if this is the case, the multi-dimensionality continues to play an important role. In fact, given that candidates are policy-motivated on the policy type, they do care about re-election as a mean to achieve their most preferred outcome and this will affect in a non-trivial way the incentives provided by voters to legislators.

Given the voting decision  $\sigma_m$ , the intertemporal utility of individual  $k$ , denoted by  $V_k$ , with  $k \in \{A, m, l\}$ , is defined as follows

$$V_A(\gamma_l^1, \gamma_g^1, \sigma_m, \gamma_l^2, \gamma_g^2) = v_{AA}^1 + \delta[\sigma_m v_{AA}^2 + (1 - \sigma_m) v_{eB}^2] \quad (8)$$

$$V_m(\gamma_l^1, \gamma_g^1, \sigma_m, \gamma_l^2, \gamma_g^2) = v_{mA}^1 + \delta[\sigma_m v_{mA}^2 + (1 - \sigma_m) v_{mB}^2] \quad (9)$$

$$V_l(\gamma_l^1, \gamma_g^1, \sigma_m, \gamma_l^2, \gamma_g^2) = v_{lA}^1 + \delta[\sigma_m v_{lA}^2 + (1 - \sigma_m) v_{lB}^2] \quad (10)$$

Assuming that the median voter  $m$  casts optimally his ballot, given the strategies adopted by the lobby  $l$  and the policy maker  $g$ , we define the equilibrium of the voting game as follows<sup>11</sup>:

**Definition 1** *The equilibrium of the voting game is a voting rule  $\sigma_m^*$  such that, given a strategy profile  $(\gamma_l^t, \gamma_g^t)$ ,  $V_m(\cdot, \sigma^*, \cdot) \geq V_m(\cdot, \sigma, \cdot)$ ,  $\forall \sigma \neq \sigma^*$ .*

With the further requirement that the strategies played in the bargaining game in each period  $t$  satisfy subgame perfection, we are now ready to define the political equilibrium:

**Definition 2** *A political equilibrium is a strategy profile  $(\gamma_l^{1*}, \gamma_g^{1*}, \sigma^*, \gamma_l^{2*}, \gamma_g^{2*})$  such that:*

---

<sup>10</sup>Alternatively, for both candidates to have a chance of winning when the electorate votes on ideological grounds, we could assume a probabilistic voting setting, where both parties always have a chance to win the elections. Hence one might wonder about the generality of the analysis carried on under alternative voting assumptions. Since the crucial assumption driving the results is the *political salience* of the non-ideological dimension, it should be clear that the deterministic or probabilistic voting are merely technical assumptions. To simplify the voting side of the model, we decided to adopt the deterministic voting framework.

<sup>11</sup>The median voter chooses a voting rule that maximizes his total utility  $V_m(\cdot, \sigma)$ , given his expectation about the legislator's behavior, as in Ferejohn (1986). Furthermore, the voting rule must be sub-game perfect, i.e. we consider only rewards/punishments that can be credibly carried on once the first period policy has been chosen. Hence, this voting rule is consistent with both retrospective and prospective voting.

- i)  $(\gamma_l^{2*}, \gamma_g^{2*})$  is a subgame perfect equilibrium of the bargaining game in  $t = 2$ ;
- ii)  $\sigma_m^*$  is an equilibrium of the voting game;
- iii)  $(\gamma_l^{1*}, \gamma_g^{1*})$  is a subgame perfect equilibrium of the bargaining game in  $t = 1$ , given the the equilibrium strategies  $\sigma_m^*$  and  $(\gamma_l^{2*}, \gamma_g^{2*})$ .

### 3 A unicameral system

Under which conditions can a single legislator be made accountable to the electorate? We start to analyze this problem characterizing the share of rents that induces him to choose the high or the low cost project. Clearly, in the two mandates, the sharing rules that implement a high cost project will be different because the legislator faces elections at the end of the first mandate only. In the second period, given a share  $\beta_g^2$  and the two alternative policy choices  $\mathbf{p}_{g,CH}^2$  and  $\mathbf{p}_{g,CL}^2$ , the payoffs accruing to the legislator are:

$$\begin{aligned} v_{gg}^2(\mathbf{p}_{g,CH}^2, T_{lg}^2) &= a_{gg} + \beta_g^2 \pi - C^H \\ v_{gg}^2(\mathbf{p}_{g,CL}^2, T_{lg}^2) &= a_{gg} \end{aligned}$$

Therefore, any share  $\beta_g^2 \geq \frac{C^H}{\pi}$  will induce him to choose the high cost project and the equilibrium shares will depend on the bargaining power of the players, i.e. on their right to make offers. In the first period, the threat of loosing elections might induce the legislator to be accountable to voters. If he chooses a low cost project, he can expect to be rewarded by voters, while if he chooses a high cost project he can be punished by the electorate and replaced by a challenger. As it is shown in the appendix, it turns out that in equilibrium the legislator is reelected if he has chosen the low cost project or if he has decided not to carry out any project, while he is not reelected if he has chosen the high cost project.<sup>12</sup> Given

---

<sup>12</sup>The intuition for this result is as follows. In the last period the incumbent's behavior does not depend on the voting rule because the game ends and he cannot be punished or rewarded by the voters. Hence, the best reply for the median voter is a strategy that induces the legislator to choose the voter's preferred policy at least in the first period. This strategy punishes the incumbent if he chooses the worse policy for voters,  $\mathbf{p}_{A,CH}^1$  and rewards him if he doesn't. Note that this strategy satisfies subgame perfection since it makes the median voter weakly better off at any time, i.e. before and after the first period policy has been chosen. We can also show that a perturbation of the electoral outcome induced for example by the presence of noise voters will not alter the equilibrium as long as the fraction of noise voters in the population is not too large. These arguments are formally established in the appendix.

this equilibrium voting strategy, the two period bargaining game can be solved by backward induction:

**Lemma 1** *Suppose that  $q\pi \geq C^H$ . In  $t = 2$  the policy  $\mathbf{p}_{g,C^H}^2$  is chosen, lobby  $l$  receives a share  $\beta_l^2 = (1 - q)$  of the rents, while the legislator  $g$  receives a share  $\beta_g^2 = q$ . In  $t = 1$ , given  $\bar{\beta}_A^1 = \delta q + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi}$ , every share  $\beta_A^1 < \bar{\beta}_A^1$  implements the policy  $\mathbf{p}_{A,C^L}^1$  and every share  $\beta_A^1 \geq \bar{\beta}_A^1$  implements the policy choice  $\mathbf{p}_{A,C^H}^1$ .*

**Proof.** In  $t = 2$ , when  $r = n$ , any proposer can make a take-it-or-leave-it offer and extract the entire profit. Legislator  $g$  makes a take-it-or-leave-it offer with probability  $q$ , while the lobby does the same with probability  $1 - q$ , and given that  $v_{gg}^2(\mathbf{p}_{g,C^H}^2, T_{lg}^2) = a_{gg} + q\pi - C^H \geq a_{gg} = v_{gg}^2(\mathbf{p}_{g,C^L}^2, T_{lg}^2)$  and  $v_{lg}^2(\mathbf{p}_{g,C^H}^2, T_{lg}^2) = a_{lg} + (1 - q)\pi \geq a_{lg} = v_{lg}^2(\mathbf{p}_{g,C^L}^2, T_{lg}^2)$ , the agreement  $\mathbf{x}_n^2 = (\mathbf{p}_{g,C^H}^2, q\pi)$  is reached. When  $r = n - 1$ , each player is willing to accept a transfer that is at least equal to what they could achieve in round  $n$  by rejecting in round  $n - 1$ . Hence, again each player would propose  $\mathbf{x}_{n-1}^2 = (\mathbf{p}_{g,C^H}^2, q\pi)$ , which will be accepted. Moving backward, at  $r = 1$  the lobby offers  $\mathbf{x}_1^2 = (\mathbf{p}_{g,C^H}^2, q\pi)$  and  $g$  accepts. Moving now to  $t = 1$ , notice that, given  $\mathbf{p}_{g,C^H}^2$ , and given the equilibrium voting strategy  $\sigma_m^* = [\sigma_m^*(\mathbf{p}_{A,C^H}^1) = 0, \sigma_m^*(\mathbf{p}_{A,C^L}^1) = 1, \sigma_m^*(\mathbf{p}_0^1) = 1]$ , then  $V_A(\mathbf{p}_{A,C^H}^1, \cdot) = a_{AA} + \beta_A^1\pi - C^H + \delta(a_{AB} - C^H) \geq V_A(\mathbf{p}_{A,C^L}^1, \cdot) = a_{AA} + \delta[a_{AA} + q\pi - C^H]$  if and only if  $\beta_A^1 \geq \delta q + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi}$ . Hence, defining  $\bar{\beta}_A^1 = \delta q + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi}$ , we obtain that if  $\beta_A^1 \geq \bar{\beta}_A^1$  is offered, the incumbent  $A$  prefers the policy  $\mathbf{p}_{A,C^H}^1$  to the policy  $\mathbf{p}_{A,C^L}^1$ . ■

Note that if  $q\pi < C^H$  the legislator will never be willing to choose the high cost policy. Hence, electoral accountability is at risk only when  $q\pi \geq C^H$ . For this reason, in the rest of the paper we will assume that this restriction holds. Regarding the first period bargaining, the critical share  $\bar{\beta}_A^1$  depends on the taxes  $C^H$  the legislator pays in the first mandate, the share of profits  $q$  he receives in the second mandate if he is reelected, and on the distance between his most preferred policy type and the policy type implemented by legislator  $B$  if he is in power,  $(a_{AA} - a_{AB})$ . In other words, the legislator is willing to choose the high cost project and not be reelected, if the share of the rents net of taxes he receives in the first mandate compensates him for the electoral loss consisting in giving up future lobby transfers and not being able to choose his most preferred policy type.

Turning now to the lobby, since as any other citizen she has preferences for policy types, she will not be indifferent to the change of legislator following the implementation of the high

cost policy in the first mandate. The following lemma provides the necessary and sufficient conditions for the lobby to prefer the high cost policy in the first period, implying a change of incumbency:

**Lemma 2** *Let  $\bar{\beta}_l^1 = \left(\frac{a_{lA} - a_{lB}}{\pi}\right)$ .  $\mathbf{x}^1 = (\mathbf{p}_{A,CH}^1, (1 - \beta_l^1)\pi)$  is an equilibrium offer in period  $t = 1$  if and only if  $\beta_l^1 \geq \delta\bar{\beta}_l^1 = \delta\left(\frac{a_{lA} - a_{lB}}{\pi}\right)$ .*

**Proof.** If in  $t = 1$  the agreement  $\mathbf{x}^1 = (\mathbf{p}_{A,CH}^1, (1 - \beta_l^1)\pi)$  is reached, the lobby obtains  $V_l(\mathbf{p}_{A,CH}^1, T_{lg}^1, \cdot) = a_{lA} + \beta_l^1\pi + \delta(a_{lB} + \beta_l^2\pi)$ . If no agreement is reached, given that  $V_A(\mathbf{p}_{A,CL}^1, \cdot) > V_A(\mathbf{p}_0^1, \cdot)$  then the legislator unilaterally chooses  $\mathbf{p}_{A,CL}^1$  and the the lobby obtains  $V_l(\mathbf{p}_{A,CL}^1, \cdot) = a_{lA} + \delta(a_{lA} + \beta_l^2\pi)$ . Hence,  $V_l(\mathbf{p}_{A,CH}^1, T_{lg}^1, \cdot) \geq V_l(\mathbf{p}_{A,CL}^1, \cdot)$  if and only if  $\beta_l^1 \geq \delta\left(\frac{a_{lA} - a_{lB}}{\pi}\right)$ . ■

We are now ready to characterize the policy choice in the first mandate in the following

**Proposition 1** *During the first mandate if  $(a_{AA} - a_{AB}) \leq \frac{1}{\delta} [(1 - \delta q)\pi - C^H] - (a_{lA} - a_{lB})$ , policy  $\mathbf{p}_{A,CH}^1$  is chosen, while for  $(a_{AA} - a_{AB}) > \frac{1}{\delta} [(1 - \delta q)\pi - C^H] - (a_{lA} - a_{lB})$ , policy  $\mathbf{p}_{A,CL}^1$  is chosen.*

**Proof.** Lemma 2 establishes that  $\beta_l^1 = \delta\bar{\beta}_l^1$  is the minimum share of rents that makes the lobby better off by reaching an agreement  $\mathbf{x}^1 = (\mathbf{p}_{A,CH}^1, T_{lg}^1)$ . From lemma 1, we know that  $\beta_A^1 = \bar{\beta}_A^1$  is the minimum payment that makes the legislator (weakly) better off by reaching an agreement  $\mathbf{x}^1 = (\mathbf{p}_{A,CH}^1, T_{lg}^1)$ . Since the lobby will pay the minimum the legislator is willing to accept, then  $\beta_A^1 = \bar{\beta}_A^1$ . Hence, all we need to show is that the lobby will obtain at least a share  $\beta_l^1 = \delta\bar{\beta}_l^1$  after she has paid  $\bar{\beta}_A^1$  or, in other words,  $(1 - \bar{\beta}_A^1) \geq \delta\bar{\beta}_l^1$ , which is true if  $(a_{AA} - a_{AB}) \leq \frac{1}{\delta} [(1 - \delta q)\pi - C^H] - (a_{lA} - a_{lB})$ . ■

The condition  $(a_{AA} - a_{AB}) \leq \frac{1}{\delta} [(1 - \delta q)\pi - C^H] - (a_{lA} - a_{lB})$  is equivalent to  $(\bar{\beta}_A^1 + \delta\bar{\beta}_l^1) \leq 1$  and states the feasibility of the minimum shares inducing the legislator and the lobby to agree on  $\mathbf{p}_{A,CH}^1$ . The shares depend on the legislator preferences for the project type, and on the bargaining power of the players. It is straightforward to verify that if the legislator has the power to make a take-it-or-leave it offer, i.e. if  $q = 1$ , and the future is not discounted ( $\delta = 1$ ) the minimum share inducing the incumbent to choose the high cost project is not feasible. Therefore, when the legislator has all the bargaining power, he will be accountable to voters. This result is summarized in

**Corollary 1** *Suppose that  $\delta = 1$ . When the legislator makes a take-it-or-leave-it offer, the policy  $\mathbf{p}_{A,CL}^1$  is implemented.*

**Proof.** If the legislator has the power to make a take-it-or-leave-it offer and  $\delta = 1$ , then he requires  $\bar{\beta}_A^1 = 1 + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi} > 1$ , which is not feasible. ■

The opposite case, in which the lobby can make a take-it-or-leave-it offer ( $q = 0$ ), represents the worst case for accountability as the minimum share implementing the high cost policy reaches the lowest value when  $q = 0$ . Note also that the polarization of the political race has a positive effect on accountability. In fact, if the race is very polarized the difference ( $a_{AA} - a_{AB}$ ) is large and as a result the feasibility of the minimum share implementing  $\mathbf{p}_{A,CH}^1$  will become less likely.

## 4 Bicameralism

An important advantage of modelling the interaction between the lobby and the parliament as a bargaining game of alternating offers is that by using this approach we can explicitly lay out the institutional setup of a sequential legislative process where, at each stage, legislators are allowed to take different actions, like vetoing or amending a proposal previously approved. In this section we will explore how alternative institutional rules (i.e. bargaining protocols) can affect electoral accountability.

Intuitively, introducing multiple legislators makes lobbying more costly, since more decision makers need to be compensated for the implementation of an unpopular policy. At the same time, introducing additional steps in the legislative process is likely to increase the time span needed for the policy to be adopted, with the result of making it potentially difficult to reach an agreement before the end of the mandate. Another less obvious implication of having multiple legislators is that their ability to make counteroffers to the lobby might be considerably reduced because of the limited time available to complete negotiations. Hence, a complex legislative structure, besides rendering it more difficult to implement new policies can also *increase* the ability of the pressure group to influence the decision making process, and make the accountability problem more severe. In what follows we will show how these forces play out under two different institutional arrangements commonly adopted in democracies, i.e. a *closed rule* and an *open rule* system. In the former, after the first legislator has

proposed a policy the other chambers only enjoy veto power. In the latter, all legislators are symmetric in the sense of being able to introduce amendments to the original proposal. We will carry out the discussion in a general environment with multiple legislators and will then analyze more in detail the bicameral system, which is the most commonly used arrangement. Before proceeding we need to adapt our notation to accommodate the more complex structure of the game.

To that end, suppose that the legislative process involves the sequential approval of  $D > 1$  chambers denoted by  $g_d$  with  $d = 1, \dots, D$ . Chamber  $g_1$  initiates the process, and lobby  $l$  starts the bargaining by making a first offer. If the offer is rejected the game goes to the next round, where the legislator can make a proposal with probability  $q$  and the lobby can make a proposal with probability  $1 - q$ . On the other hand, if the first proposal by the lobby is accepted, the bargaining between  $l$  and  $g_1$  ends with an agreement. The legislation then passes to the next chamber  $g_2$ , with whom the lobby starts a new bargaining game making a proposal that  $g_2$  can accept or reject etc. Let  $\mathbf{x}_{g_1}^t = (\mathbf{p}_{g_1}^t, T_{lg_1}^t)$  be a proposal upon which an agreement has been reached by the lobby and the first legislator, where  $\mathbf{p}_{g_1}^t \in \mathbf{P}^t$ . When chambers  $g_d$ ,  $d > 1$  only have veto power, the feasible policy set available to legislators  $d > 1$  is  $\mathbf{p}_{g_1}^t$ , since they can only decide whether to ratify the policy chosen by the first chamber or veto it. If they instead have amendment rights, the set of feasible policies coincides with  $\mathbf{P}^t$ . Let  $\beta_{g_d}^t$  be the share of the rents paid to legislator  $g_d$ , so that  $T_{lg_d}^t = \beta_{g_d}^t \pi$  and let  $g_{d'}$  be a generic legislator, where  $d' > 1$ . The lobby's residual profit after an agreement  $\mathbf{x}_{g_{d'}}^t$  has been reached with legislator  $d'$  are then given by  $\pi_{g_{d'}}^t = \pi(1 - \sum_{d=1}^{d'} \beta_{g_d}^t)$  and the set of feasible agreements between  $g_{d'+1}$  and  $l$  is given by  $\mathbf{X}_{g_{d'+1}}^t = \{(\mathbf{p}_{g_1}^t, T_{lg_{d'+1}}^t) : \pi_{g_{d'}}^t - T_{lg_{d'+1}}^t \geq 0\}$  under *closed rule* and  $\mathbf{X}_{g_{d'+1}}^t = \{(\mathbf{p}_{g'}^t, T_{lg_{d'+1}}^t) : \pi_{g_{d'}}^t - T_{lg_{d'+1}}^t \geq 0\}$  under *open rule*. Figure 2 illustrates the structure of the game under open rule.

For simplicity, we rule out the possibility of divided government in our model, assuming that all legislators belong to the same party and therefore the direct benefit from the policy  $a_g$  arising to legislator  $g_d$  can be normalized to  $a_{gg}$ .<sup>13</sup> The one period payoff to the various agents are analogous to those reported in equations 1 - 4, just replacing equations 3 and 4

---

<sup>13</sup>Although in most bicameral systems the two chambers have the same type of majority, divided chambers are not uncommon for example in the US Congress. In a companion paper (Testa, 2004), we show how divided government decreases electoral accountability.

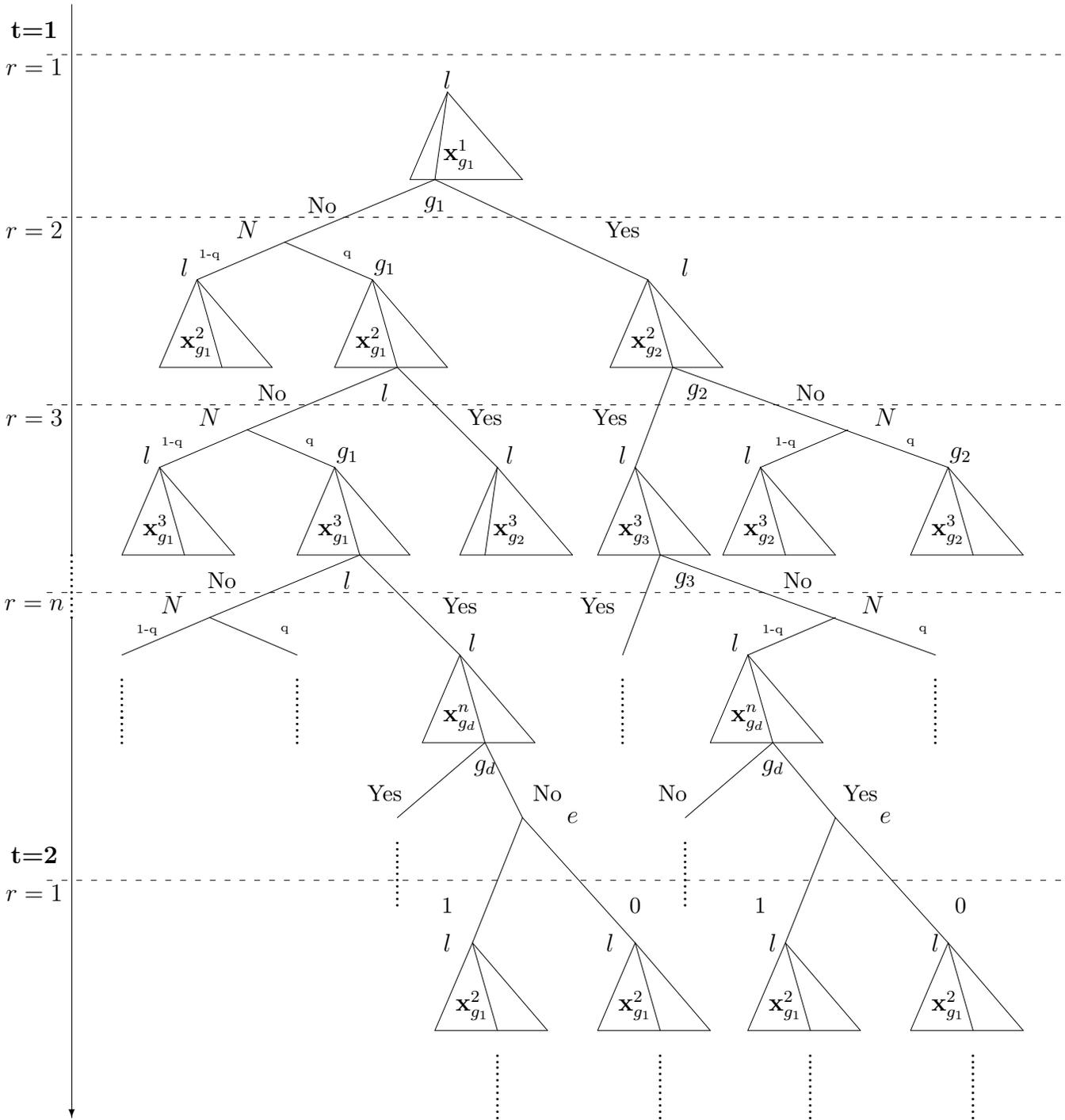


Figure 2: *Open rule* Multicameralism

with

$$v_{lg}^t(\mathbf{p}_{g,C}^t, T_{lg_1}, \dots, T_{lg_D}) = a_{lg} + (1 - \sum_{d=1}^D \beta_{g_d}^t) \pi \quad (11)$$

$$v_{g_dg}^t(\mathbf{p}_{g,C}^t, T_{lg_1}, \dots, T_{lg_D}) = a_{g_dg} + \beta_{g_d}^t \pi - C \quad (12)$$

Notice that with  $D$  legislators, at least  $n = D$  rounds of negotiations are necessary to pass a policy proposal. Let  $(\gamma_l^{t,r}, \gamma_{g_d}^{t,r})$  be a pair of strategies played by legislator  $g_d$  and lobby  $l$  in the bargaining game beginning in  $r$ , with  $r \geq 1$  and  $d \geq 1$  and let  $r + s$  with  $s \geq 1$  denote all future possible rounds within a mandate  $t$ . A voting strategy for the median voter  $m$  is a mapping  $\sigma_m : \mathbf{P}^1 \rightarrow \{0, 1\}$  where  $\sigma_m = 1$  indicates that all the legislators  $\{1, \dots, D\}$  belonging to party A will be reelected, while  $\sigma_m = 0$  means instead that the median voter will cast his ballot in favor of party B.  $V_k$ , the intertemporal utility of individual  $k$ ,  $k \in \{g_d = A, e, l\}$  can then be defined as follows:

$$V_{g_d} = v_{g_dA}^1 + \delta[\sigma_m v_{g_dA}^2 + (1 - \sigma_m) v_{eB}^2] \quad (13)$$

$$V_m = v_{mA}^1 + \delta[\sigma_m v_{mA}^2 + (1 - \sigma_m) v_{mB}^2] \quad (14)$$

$$V_l = v_{lA}^1 + \delta[\sigma_m v_{lA}^2 + (1 - \sigma_m) v_{lB}^2] \quad (15)$$

We are now ready to define the political equilibrium. For the voting game, we can use the previous definition<sup>14</sup>. Concerning the lobbying, we now have a sequence of bargaining games between  $l$  and  $g_d$  within each mandate  $t$ . Hence, for subgame perfection to hold, in  $t = 2$  we must require that that the strategies played by  $l$  and  $g_d$  in the game starting in  $r$  are subgame perfect given not only any strategy played by  $l$  and  $g_d$  in their future rounds of negotiation, but also given any strategies played by  $l$  and successive legislators  $g_{d+1}$  in every subsequent bargaining game taking place within the same mandate. In  $t = 1$ , on the other hand, we must take into account not only the strategies played in every future round within that period, but also the voting strategy played by the median voter at the end of the first period and the strategies played in every bargaining game between  $l$  and  $g_d$  in  $t = 2$ . Formally, we require the following :

---

<sup>14</sup>The only difference here is that the median voter chooses a voting strategy maximizing  $V_m(\cdot)$  given a more complex strategy profile  $(\gamma_l^{1,r}, \gamma_{g_d}^{1,r}, \gamma_l^{2,r}, \gamma_{g_d}^{2,r})$  of the first and second period bargaining games between  $l$  and  $g_d$ .

**Definition 3** A strategy pair  $(\gamma_l^{2,r*}, \gamma_{g_d}^{2,r*})$  is a subgame perfect equilibrium of the bargaining game between  $l$  and  $g_d$  starting in round  $r$  of mandate  $t = 2$  if the strategy pair it induces in every subgame is a Nash equilibrium of that subgame, given any strategy profile  $(\gamma_l^{2,r+s}, \gamma_{g_d}^{2,r+s}) \forall r, d$ .

**Definition 4** A strategy pair  $(\gamma_l^{1,r*}, \gamma_{g_d}^{1,r*})$  is a subgame perfect equilibrium of the bargaining game between  $l$  and  $g_d$  starting in round  $r$  of mandate  $t = 1$  if the strategy pair it induces in every subgame is a Nash equilibrium of that subgame, given any strategy profile  $(\gamma_l^{1,r+s}, \gamma_{g_d}^{1,r+s}, \sigma_m, \gamma_l^{2,r}, \gamma_{g_d}^{2,r}) \forall r, d$ .

**Definition 5** A political equilibrium is a strategy profile  $(\gamma_l^{1,r*}, \gamma_{g_d}^{1,r*}, \sigma_m^*, \gamma_l^{2,r*}, \gamma_{g_d}^{2,r*})$  such that:

- i)  $(\gamma_l^{2,r*}, \gamma_{g_d}^{2,r*})$  is a subgame perfect equilibrium of each second period bargaining game between  $l$  and  $g_d$  beginning in  $r$ ;
- ii)  $\sigma_m^*$  is an equilibrium of the voting game;
- iii)  $(\gamma_l^{1,r*}, \gamma_{g_d}^{1,r*})$  is a subgame perfect equilibrium each first period bargaining game between  $l$  and  $g_d$  beginning in  $r$ .

## 4.1 Closed rule

The proposal power of the players in the bargaining game depends on their ability to make counter-offers. In particular, by making a take-it-or-leave-it offer, the last proposer can capture the entire rent. So far we have assumed that independently of the legislative process, the lobby can make the last proposal with probability  $(1 - q)$ . However, the length of the legislative process is likely to have an important impact on the right of the legislators to make counter-offers. In particular, by increasing the number of chambers in the Parliament, the minimum number of negotiation rounds necessary to give multiple legislators the same proposal power of a single legislator increases. This result is summarized in the next

**Lemma 3** *The following holds:*

- i) Suppose that  $n = D + k$ , with  $k > 1$ . In  $t = 2$ ,  $\mathbf{p}_{g,CH}^2$  is chosen and  $\beta_{g_1}^2 = q$ , while  $\beta_{g_d}^2 = 0 \forall d > 1$ . In  $t = 1$  the minimum profit shares required by each legislator  $g_d$  to choose  $\mathbf{p}_{A,CH}^1$  are  $\bar{\beta}_{g_1}^1 = \bar{\beta}_A^1 = \delta q + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi}$  and  $\bar{\beta}_{g_d}^1 = \frac{\delta(a_{AA} - a_{AB})}{\pi} + \frac{C^H - a_{AA}}{\pi} \forall d > 1$ .

ii) Suppose that  $n = D$ . In  $t = 2$ ,  $\mathbf{p}_{g,CH}^2$  is chosen and  $\beta_{g_1}^2 = \frac{C^H}{\pi}$ , while  $\beta_{g_d}^2 = 0 \forall d > 1$ . In  $t = 1$  the minimum share required to implement  $\mathbf{p}_{A,CH}^1$  are  $\bar{\beta}_{g_1}^1 = \delta \frac{C^H}{\pi} + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi}$  and  $\bar{\beta}_{g_d}^1 = \frac{\delta(a_{AA} - a_{AB})}{\pi} + \frac{C^H - a_{AA}}{\pi} \forall d > 1$ .

**Proof.** In  $t = 2$  the following holds. For  $n = D + k$ , the first legislator  $g_d$  has the power to make at least one counter-offer with probability  $q$ . In the absence of lobby transfers ( $T_{lg_d}^2 = 0$ ) given that  $v_{g_dg}^2(\mathbf{p}_{g,CL}^2) > v_{g_dg}^2(\mathbf{p}_{g,CH}^2) > v_{g_dg}^2(\mathbf{p}_0^2)$ , the first legislator  $g_1$  can credibly enforce  $\mathbf{p}_{g,CL}^2$ . On the other hand, under a closed rule arrangement legislators  $g_d$ ,  $d > 1$ , can only approve or veto the policy chosen by  $g_1$ . Furthermore, since  $v_{g_dg}^2(\mathbf{p}_{g,C}^2, T_{lg_d}^2) > v_{g_dg}^2(\mathbf{p}_0^2) \forall \beta_{g_d}^2, C$ , vetoing is not credible. As a consequence, if the lobby can induce the first legislator to choose  $\mathbf{p}_{g,CH}^2$ , then she does not need to pay any positive transfer to convince  $g_d$  with  $d > 1$  to pass  $\mathbf{p}_{g,CH}^2$ . We can now determine the equilibrium transfers inducing the first legislator to choose  $\mathbf{p}_{g,CH}^2$ . Let  $r$  be the last round of negotiation between  $g_1$  and  $l$ . Knowing that the two players can make a take-it-or-leave-it offer respectively with probability  $q$  and  $1 - q$ ,  $g_1$  receives  $q\pi$  and  $l$  receives  $(1 - q)\pi$ . Moving to round  $r - 1$ , the minimum payment that  $g_1$  is willing to accept is  $q\pi$  and similarly for  $l$  it will be  $(1 - q)\pi$ . The same is true moving backward until  $r = 1$ , when the lobby  $l$  offers  $\mathbf{x}_1^2 = (\mathbf{p}_{g,CH}^2, T_{lg_1}^2 = q\pi)$  and  $g_1$  accepts. On the other hand, for  $n = D$  the lobby makes take-it-or-leave-it offers  $\mathbf{x}^2 = (\mathbf{p}_{g,CH}^2, T_{lg_d}^2 = 0)$  to each legislator  $g_d$   $d > 1$ , which will be accepted since  $v_{g_dg}^2(\mathbf{p}_{g,CH}^2, T_{lg_d}^2 = 0) > v_{g_dg}^2(\mathbf{p}_0^2)$ , while she offers  $\mathbf{x}^2 = (\mathbf{p}_{g,CH}^2, T_{lg_1}^2 = C^H)$  to legislator  $g_1$  who accepts. Moving to  $t = 1$ , when  $n = D + k$ , since  $V_{g_1}(\mathbf{p}_{A,CH}^1, T_{lg_d}^1, \cdot) \geq V_{g_1}(\mathbf{p}_{A,CL}^1, T_{lg_d}^1, \cdot)$  if and only if  $\beta_{g_1}^1 \geq \bar{\beta}_A^1$ , the first legislator prefers  $\mathbf{p}_{A,CH}^1$  over  $\mathbf{p}_{A,CL}^1$  if he receives at least  $\delta\beta_{g_1}^2 + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi}$ , where  $\beta_{g_1}^2 = q$ . Furthermore,  $V_{g_d}(\mathbf{p}_{g,CH}^1, T_{lg_d}^1, \cdot) \geq V_{g_d}(\mathbf{p}_0^1, \cdot)$ , if and only if  $\beta_{g_d}^1 \geq \frac{\delta(a_{AA} - a_{AB})}{\pi} + \frac{C^H - a_{AA}}{\pi}$ . Hence, when  $\frac{\delta(a_{AA} - a_{AB})}{\pi} - \frac{C^H - a_{AA}}{\pi} \geq 0$  legislators  $g_d$ ,  $d > 1$  can credibly threaten to veto the proposal passed by  $g_1$ , unless they receive  $\bar{\beta}_{g_d}^1 = \frac{\delta(a_{AA} - a_{AB})}{\pi} + \frac{C^H - a_{AA}}{\pi}$ . On the other hand, if  $\frac{\delta(a_{AA} - a_{AB})}{\pi} + \frac{C^H - a_{AA}}{\pi} < 0$ ,  $g_d$  cannot credibly veto any previously approved policy and therefore  $\bar{\beta}_{g_d}^1 = 0 \forall d > 1$ . At the same time, when  $n = D$  then  $\beta_{g_d}^2 = 0 \forall d > 1$  while  $\beta_{g_1}^2 = \frac{C^H}{\pi}$  and therefore  $\bar{\beta}_{g_1}^1 = \delta \frac{C^H}{\pi} + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi}$ , while  $\bar{\beta}_{g_d}^1 \forall d > 1$  is not affected. ■

Note that legislators enjoying only veto power cannot extract any rent in the last mandate, while the legislator with proposal power is able to extract some rents ( $T_{lg_1}^2 - C^H > 0$ ) as long as the number of available rounds is sufficient for him to make at least one counter-offer with some probability. An example will help us to illustrate the link between the number of legislators and their ability to make counter-offers. Consider the case of a bicameral system,

where  $D = 2$ . In that context, the minimum number of negotiation rounds needed for a chamber to be able to make at least one counter-offer with probability  $q$  is  $n = 3$ . If there were at most two feasible rounds of negotiations, the two legislators would not be able to make counter-offers, because a rejection by one chamber would trigger the termination of the process, since the remaining number of rounds is not sufficient for the policy proposal to be approved.<sup>15</sup> Among the situations that could give rise to this outcome, complex negotiations in coalitional governments, lengthy parliamentary procedures<sup>16</sup> and legislative proposals initiated towards the end of the mandate are just a few of the possible examples.

From lemma 3 we can see that the total share of rents received by policymakers in a setting with  $D$  legislators and  $D + k$  rounds of negotiations is larger than the share received by policymakers in the single legislator case i.e.  $\sum_{d=1}^D \bar{\beta}_{g_d}^1 \geq \bar{\beta}_A^1$ . This implies that the cost of lobbying increases monotonically with the number of legislators,<sup>17</sup> with the exception of the case where the policy maker has the power to make a take-it-or-leave-it offer. On the other hand, when the number of available rounds is just sufficient for multiple legislators to approve a policy proposal ( $n = D$ ), then multiple legislators are not necessarily more likely to implement the low cost policy, because the total cost of lobbying does not always increase with the number of legislators, as it is shown in the following

**Lemma 4** *Suppose that  $n = D$ . If  $(D - 1)[\delta(a_{AA} - a_{AB}) + C^H - a_{AA}] < \delta(q\pi - C^H)$ , then the share of rents paid to a single legislator is bigger than the sum of the shares paid to  $D$  legislators, while the opposite holds if  $(D - 1)[\delta(a_{AA} - a_{AB}) + C^H - a_{AA}] \geq \delta(q\pi - C^H)$ .*

**Proof.** When  $n = D$ , since  $\bar{\beta}_A^1 = \delta q + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi}$ ,  $\bar{\beta}_{g_1}^1 = \delta \frac{C^H}{\pi} + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi}$ ,  $\bar{\beta}_{g_d}^1 = \frac{\delta(a_{AA} - a_{AB})}{\pi} + \frac{C^H - a_{AA}}{\pi} \forall d > 1$  then  $\bar{\beta}_{g_1}^1 + (D - 1)\bar{\beta}_{g_d}^1 \leq \bar{\beta}_A^1 \Leftrightarrow (D - 1)[\delta(a_{AA} - a_{AB}) + C^H - a_{AA}] \leq$

<sup>15</sup> Since the lobby initiates the bargaining by making the first proposal, if the number of available rounds is not sufficient for the legislators to make counter offers, the lobby enjoys a first mover advantage. Of course, if the power to initiate the bargaining was randomly assigned, then the number of rounds will not affect the power to make counteroffers since the lobby and the legislator will both be first movers with some probability.

<sup>16</sup>The recent and much talked about use of the *filibuster* in the US senate to block the nomination of judge Estrada to the DC appeals court is just one example. See “Waiting for Godot” in *The Economist* November 13, 2003.

<sup>17</sup>We focus on the cost of lobbying associated with the electoral loss of multiple legislators because we are mainly interested in electoral incentives. However it should be clear that having multiple chambers deciding sequentially rather than simultaneously can have a substantial impact on the lobby’s ability to bribe the legislator whenever lobbying is a costly, time consuming activity or the rents emerging from an agreement decrease with time. Hence, our results on the positive effect of bicameralism on accountability hold *a fortiori* if we introduce either a cost of lobbying or a profit that are time dependent.

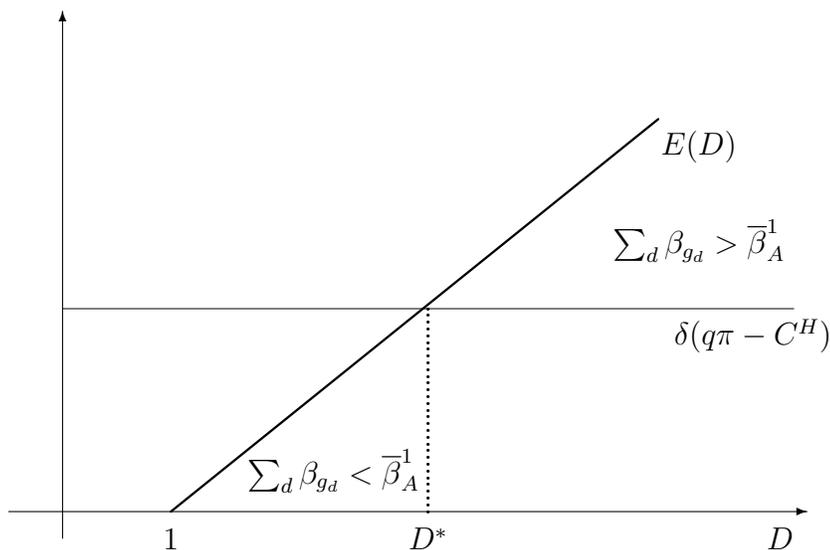


Figure 3: *Closed rule* Multicameralism

$\delta(q\pi - C^H)$ .

The intuition for this result is as follows. The transfer necessary to induce a legislator to choose the high cost policy in the first period includes two elements. The first is the compensation for the ‘policy component’ of the electoral loss (ideological loss and high taxes) he will suffer by choosing a policy against the voters’ interests, where the electoral loss is equal to  $[\delta(a_{AA} - a_{AB}) + C^H]$  for the legislator with proposal power and  $\delta[(a_{AA} - a_{AB}) + C^H] + \frac{C^H - a_{AA}}{\pi}$  for the legislators with only veto power. The second is the compensation for the loss of future transfers  $T_{lgd}^2$  the legislator could obtain, if in office, by bargaining with the lobby in the second mandate, which clearly depends on his bargaining power. When multiple legislators are introduced, the effect on the total transfers to be paid is ambiguous. On the one hand, the size of the electoral loss via the policy component increases, while on the other the bargaining power of the legislators decreases since the first legislator is kept at his reservation utility obtaining a transfer  $T_{lg1}^2 = C^H$ . Hence, if the increase in the policy component of the electoral loss more than compensates the decrease in bargaining power, multiple legislators will be more accountable. If the loss of bargaining power outweighs instead the electoral loss, then the presence of multiple legislators has a negative impact on accountability. Interestingly, the proposition shows a non-linear relationship between accountability and the number of legislators that is illustrated in figure 3, where  $E(D) = (D - 1)[\delta(a_{AA} - a_{AB}) + C^H - a_{AA}]$ .

From the diagram we can see that a number of legislators below  $D^*$  reduces accountability, and only when  $D > D^*$  the policy component of the electoral loss is sufficiently high to offset the decrease in bargaining power associated to multiple legislators. Although theoretically  $D$  can be arbitrarily large, in real world legislatures we never observe more than two chambers<sup>18</sup>. It is therefore interesting to explore whether bicameralism possesses the appealing feature of improving accountability, when the second chamber has only veto power. To keep the characterization of the policy choice as simple as possible, from now on we will assume that the lobby always prefers the high cost to the low cost policy, i.e. that lemma 2 holds for every bargaining share. Notice also that if  $\frac{\delta(a_{AA}-a_{AB})}{\pi} + \frac{C^H-a_{AA}}{\pi} < 0$ , an increase in the number of legislators does not affect accountability. For this reason, in the remainder of the paper, we will make the following:

**Assumption 1**  $\frac{\delta(a_{AA}-a_{AB})}{\pi} + \frac{C^H-a_{AA}}{\pi} > 0$ .

Let  $\bar{\beta}_{A,D}^1$  be the sum of the minimum rent shares  $D$  legislators are willing to accept to implement  $\mathbf{p}_{A,CH}^1$  when  $n = D$  and let  $\bar{\beta}_{A,D+1}^1$  be the sum of the minimum shares required when  $n \geq D + 1$ . The next result fully characterizes the policy choice under unicameralism and bicameralism:

**Theorem 1** *For  $n \geq 3$ , if  $\bar{\beta}_A^1 < \bar{\beta}_{A,3}^1 < 1$ , then  $\mathbf{p}_{A,CH}^1$  is chosen under both unicameralism and bicameralism, while if  $\bar{\beta}_A^1 < 1 < \bar{\beta}_{A,3}^1$  then  $\mathbf{p}_{A,CH}^1$  is chosen under unicameralism only. On the other hand, for  $n = 2$  the following holds. If  $\bar{\beta}_A^1 < \bar{\beta}_{A,2}^1 < 1$  then  $\mathbf{p}_{A,CH}^1$  is implemented under both unicameralism and bicameralism, while for  $\bar{\beta}_A^1 > \bar{\beta}_{A,2}^1 > 1$  or  $\bar{\beta}_{A,2}^1 > \bar{\beta}_A^1 > 1$ ,  $\mathbf{p}_{A,CL}^1$  is chosen under both systems. Finally, if  $\bar{\beta}_{A,2}^1 < 1 < \bar{\beta}_A^1$  then  $\mathbf{p}_{A,CH}^1$  is chosen under bicameralism only, and if  $\bar{\beta}_A^1 < 1 < \bar{\beta}_{A,2}^1$  then  $\mathbf{p}_{A,CH}^1$  is implemented under unicameralism only.*

**Proof.** Given  $\beta_l^1 \geq \delta(\frac{a_{lA}-a_{lB}}{\pi})$ , lemmata 1-3 imply that if the minimum shares required by a *single* and by *two* chambers to choose  $\mathbf{p}_{A,CH}^1$  are feasible, then  $\mathbf{p}_{A,CH}^1$  is chosen. These minimum shares are  $\bar{\beta}_{A,2}^1 = 2\delta\frac{(a_{AA}-a_{AB})}{\pi} + \frac{(2+\delta)C^H-a_{AA}}{\pi}$ ,  $\bar{\beta}_{A,3}^1 = \delta q + 2\delta\frac{(a_{AA}-a_{AB})}{\pi} + \frac{2C^H-a_{AA}}{\pi}$

---

<sup>18</sup>An arbitrarily large number of legislator would obviously improve the electoral accountability at the expenses of the amount of legislation that could be passed. Hence, although a large number of legislators has the appealing feature of increasing accountability, clearly the number cannot realistically increase beyond a level that would result in a substantial legislative impasse.

and  $\bar{\beta}_A^1 = \delta q + \delta \frac{C^H + (a_{AA} - a_{AB})}{\pi}$  with respectively *two* and *one* legislator. First note that  $\bar{\beta}_{A,3}^1 > \bar{\beta}_A^1$ , and if  $\bar{\beta}_{A,3}^1 < 1$ , then both  $\bar{\beta}_{A,3}^1$  and  $\bar{\beta}_A^1$  are feasible. When on the other hand  $\bar{\beta}_A^1 < 1 < \bar{\beta}_{A,3}^1$ ,  $\bar{\beta}_A^1$  only is feasible. Noting also that  $\bar{\beta}_{A,2}^1 \leq \bar{\beta}_A^1$  the following can be established. If  $\bar{\beta}_{A,2}^1 < 1 < \bar{\beta}_A^1$ , only the share with two legislators is feasible; when  $\bar{\beta}_{A,2}^1 < \bar{\beta}_A^1 < 1$  both shares are feasible; when  $1 < \bar{\beta}_{A,2}^1 < \bar{\beta}_A^1$ , none of the shares is feasible, while when  $\bar{\beta}_A^1 < 1 < \bar{\beta}_{A,2}^1$  only the share with a single legislator is feasible. ■

For this reason we can conclude that only when the first chamber retains some bargaining power ( $n \geq 3$ ) bicameralism can unambiguously improve accountability, while lobby capture might well become easier if the increased complexity of bicameralism results in a loss of bargaining power on the legislator side.

## 4.2 Open rule

When amendment rights are ruled out, the power to choose the content of the new legislation is given entirely to the chamber initiating the process and the following legislators can only decide whether to approve or not the initial proposal. If amendment rights are instead introduced, the following legislators can actually modify the original policy. Since the first chamber will anticipate this possibility, the existence of amendment rights is likely to have an important effect, and to analyze it we concentrate for simplicity on the case where all  $D$  legislators have the possibility to make at least one counter-offer (i.e.  $n \geq 2D$ ). We consider both the case of *unrestricted amendment rights*, i.e. the situation in which the policy passed by the previous chamber can unilaterally be modified by the subsequent legislators, and the situation in which the amendments introduced require the approval of all legislators (*restricted amendment rights*). In both cases, chambers  $d > 1$  can only amend a legislative proposal passed by the first chamber, or in other words, they do not have the power to initiate the legislative process.<sup>19</sup> If no legislation is passed in the first chamber, then the mandate ends with the no policy outcome.

Since in the second term the policy  $\mathbf{p}_{g,CH}^2$  is always implemented, we focus on the first period policy choice.<sup>20</sup> Let  $\bar{\beta}_{gd}^1 = R\delta q(1-q)^{d-1} + g(d, R)\delta q + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi}$  be the minimum payment that each legislator  $g_d$  is willing to accept in order to implement  $\mathbf{p}_{A,CH}^1$  under

<sup>19</sup>This type of arrangement is very common. For instance, in the US only the House of representative can initiate budget legislation.

<sup>20</sup>See lemma 7 in appendix for the full characterization of the bargaining in  $t = 2$ .

restricted ( $R = 1$ ) or unrestricted ( $R = 0$ ) amendment rights, where  $g(d, 1) = 0 \forall d$ ,  $g(d, 0) = 0 \forall d < D$  and  $g(d, 0) = 1$  if  $d = D$ . The next result summarizes our main findings:

**Theorem 2** *The following holds:*

- i) Under restricted amendment rights ( $R = 1$ ), if  $\sum_{d=1}^D \bar{\beta}_{gd}^1 \leq 1$ ,  $\mathbf{p}_{A,CH}^1$  is chosen while if  $\sum_{d=1}^D \bar{\beta}_{gd}^1 > 1$ , then  $\mathbf{p}_{A,CL}^1$  is chosen.*
- ii) Under unrestricted amendment rights ( $R = 0$ ), if  $\sum_{d=1}^D \bar{\beta}_{gd}^1 \leq 1$ ,  $\mathbf{p}_{A,CH}^1$  is chosen while if  $\bar{\beta}_{gD}^1 = \bar{\beta}_A^1 > 1$  then  $\mathbf{p}_{A,CL}^1$  is chosen. Finally if  $\sum_{d=1}^{D-1} \bar{\beta}_{gd}^1 > 1$  but  $\bar{\beta}_{gD}^1 = \bar{\beta}_A^1 < 1$  then no policy ( $\mathbf{p}_0^1$ ) is implemented.*

**Proof.** See Appendix.

Note that in case sub *ii*) of theorem 2 under unrestricted amendment rights the *status quo* ( $\mathbf{p}_0^1$ ) is implemented, while for the same parameter values under a closed rule system the final policy outcome would have been  $\mathbf{p}_{A,CL}^1$ . This result highlights how the existence of unrestricted amendment rights generates a *status quo* bias. On the other hand, when all legislators have the same power, not only the share of rent required by legislators increases compared to the closed rule case, but legislators are effectively made more accountable since no status quo bias arises as in the case of unrestricted amendment rights. Consequently, our analysis suggests that, even when amendment rights may increase the cost of lobbying, restrictions should be considered to avoid situations of legislative *impasse*. This factor seems to have been taken into account in the design of many legislative bodies around the world, in which amendments implemented by the second chamber need to be approved by the first chamber as well<sup>21</sup>.

To complete our discussion of bicameralism and accountability, we would like to briefly consider another example in which bicameralism is neutral. Suppose that for a given economic environment, the policy preferred by the lobby is the *status quo*, while the voters prefer instead a different policy. In this case, with a bicameral system, voters need the approval of two legislative bodies to see the implementation of their preferred policy, while the lobby will be satisfied just by the negative decision of one chamber. It is then clear that the existence of a second legislator does not have any effect since the cost of lobbying does

---

<sup>21</sup>In most cases, this means that the text of a bill needs to be approved in the same form by both legislative bodies.

not change compared to the one chamber case. In other words, policy choices implemented by *negative* decisions are “cheaper” to buy than policy choices requiring a *positive* decision. Therefore, if the lobby supports the status quo, increasing the number of legislators does not help solving the accountability problem.

## 5 Conclusions

In this paper we have developed a theoretical framework to analyze the effects of legislative arrangements on the lawmakers’ accountability to the public. In particular, inspired by the thoughts of the founding fathers of modern democracies, we have considered how the organization of the legislative power, i.e. the number of chambers in a parliament and the allocation of powers among them, can discipline elected representatives and limit the ability of pressure groups to buy influence. To that end, we have built a model in which legislators interact with a lobby group through a bargaining process and with voters by means of elections.

The main result of our analysis is that the relationship between legislative arrangements and accountability depends in a fundamental way on the structure of the bargaining game. By considering different protocols we have shown that only when a single legislator has the power to make a take-it-or-leave-it offer to the lobby, he will be unambiguously accountable to voters. Whenever the lobby enjoys some bargaining power, two chambers may instead help to increase accountability. As it turns out, the effectiveness of a bicameral system crucially depends on the rules governing the functioning of the two elected bodies, and in particular on the allocation of the decision power between the chambers. For accountability purposes the best incentives are provided whenever two legislative bodies share equal decision powers (i.e. restricted amendment rights). Having instead unrestricted amendment rights can result in a status quo bias, whereby no new legislation is passed. Another intriguing result emerging from our analysis is that the increased complexity of the legislative process induced by an additional chamber may come with an undesirable effect, i.e. the loss of bargaining power for the elected body vis à vis the lobby. When the legislative process becomes longer, more rounds are necessary to approve a proposal. Given that a policy needs to be agreed upon by the end of the mandate, legislators may not have the time to engage in the negotiation with the lobby in order to extract some rents. As a consequence, the lobby retains the

power to make take-it-or-leave-it offers. When this happens, bicameralism might well have a detrimental effect on accountability. Hence, our analysis suggests that bicameralism should not be considered a *panacea* against the abuse of power, and that instead any institutional reform aimed at increasing the accountability of elected legislators should pay close attention to the distribution of powers between the parliament's chambers.

Another important result of our model is that legislator's accountability is also related to the characteristics of the political race, since the polarization in party position enhances electoral discipline. The polarization result is robust to the alternative specifications of the bargaining game and the degree of polarization necessary to keep the legislator accountable is increasing in the bargaining power of the lobby group. As for further work, we can think of at least two ways to extend our analysis. First, we have assumed the polarization of the political race as exogenously given, but the relationship between polarization in society and polarization in the political race remains an important open question that requires further investigation.<sup>22</sup> Secondly, our model could be brought to the data to study how different allocations of veto power and amendment rights between multiple legislative bodies affect policy making.

## 6 Appendix

### 6.1 Equilibrium Voting Strategy

**Lemma 5** *The strategy  $\sigma_m^* = [\sigma_m^*(\mathbf{p}_{A,CH}^1) = 0, \sigma_m^*(\mathbf{p}_{A,CL}^1) = 1, \sigma_m^*(\mathbf{p}_0^1) = 1]$  is an equilibrium voting strategy, i.e.  $V_m(\cdot, \sigma_m^*) \geq V_m(\cdot, \sigma_m) \forall \sigma_m \neq \sigma_m^*$ .*

**Proof.** Since the voting decision depends only on the policy outcome, the same argument applies for a single as well as for multiple legislators. This proof is therefore carried out for the more general situation in which we have  $D$  legislators. Notice that since  $q\pi \geq C^H$ , in the second period  $\mathbf{p}_{A,CH}^2$  is chosen under any legislative procedure and given any voting rule. Hence, we conclude that to show whether  $V_m(\cdot, \sigma_m^*) \geq V_m(\cdot, \sigma_m)$ , we only need to analyze the first period payoff  $v_m^1(\mathbf{p}^1, \sigma_m)$  for all  $\sigma_m$ . Let us start by considering the following alternative strategy

$$\sigma_m^1 = [\sigma_m^1(\mathbf{p}_{A,CH}^1) = 1, \sigma_m^1(\mathbf{p}_{A,CL}^1) = 1, \sigma_m^1(\mathbf{p}_0^1) = 1]$$

---

<sup>22</sup>See Gomberg, Marhuenda, and Ortuno-Ortin (2004) and Testa (2003b).

Under  $\sigma_m^1$ ,  $\mathbf{p}_{A,CH}^1$  is the policy preferred by any legislator receiving  $\beta_{gd} \geq 0$ , since he can receive lobby transfers and choose his most preferred policy in both periods. On the other hand, under the voting strategy  $\sigma_m^*$  depending on the parameters of the model, either  $\mathbf{p}_{A,CH}^1$  or  $\mathbf{p}_{A,CL}^1$  can be implemented. Notice that from propositions 1 – 6, when the policy  $\mathbf{p}_{A,CH}^1$  is chosen then  $V_m(\cdot, \sigma_m^1) = V_m(\cdot, \sigma_m^*)$ . On the other hand, when the policy  $\mathbf{p}_{A,CL}^1$  is chosen then  $V_m(\cdot, \sigma_m^1) < V_m(\cdot, \sigma_m^*)$ . Hence, we conclude that  $V_m(\cdot, \sigma_m^1) \leq V_m(\cdot, \sigma_m^*)$  and therefore  $\sigma_m^1$  is not an equilibrium strategy. Consider next the following alternative strategy

$$\sigma_m^2 = [\sigma_m^2(\mathbf{p}_{A,CH}^1) = 0, \sigma_m^2(\mathbf{p}_{A,CL}^1) = 0, \sigma_m^2(\mathbf{p}_0^1) = 0]$$

Under the voting rule  $\sigma_m^2$  the incumbent is never reappointed. Therefore, since  $\mathbf{p}_{A,CH}^1$  generates a higher net profit to be shared,  $V_{gd}(\mathbf{p}_{A,CH}^1) \geq V_{gd}(\mathbf{p}_{A,CL}^1) \forall \beta_{gd}^1 \geq 0$ , which implies that  $\mathbf{p}_{A,CH}^1$  will always be chosen. Hence, as in the previous case,  $\sigma_m^2$  is not an equilibrium voting strategy. Consider next

$$\sigma_m^3 = [\sigma_m^3(\mathbf{p}_{A,CH}^1) = 0, \sigma_m^3(\mathbf{p}_{A,CL}^1) = 1, \sigma_m^3(\mathbf{p}_0^1) = 0]$$

Note that under this voting strategy a legislator is not re-elected if he chooses the status quo. As  $v_{gd}^1(\mathbf{p}_{A,CL}^1) > v_{gd}^1(\mathbf{p}_0^1)$  for all  $d$ , when legislators do not receive transfers from the lobby, they always prefer to implement  $\mathbf{p}_{A,CL}^1$ , i.e.  $\mathbf{p}_{A,CL}^1$  is their outside option. Since when offered transfers legislators choose between  $\mathbf{p}_{A,CH}^1$  and their outside option  $\mathbf{p}_{A,CL}^1$ , the punishment  $\sigma_m^3(\mathbf{p}_0^1) = 0$  is irrelevant except for the unrestricted amendment rights case, where  $\mathbf{p}_0^1$  can be an outside option. Remember that with unrestricted amendment rights, given  $\sigma_m^*$ , we know that if  $\delta q + D[\frac{C^H + \delta(a_{AA} - a_{AB})}{\pi}] > 1$  but  $\delta q + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi} < 1$ , then for  $\delta \geq \hat{\delta}$ ,  $V_{g1}(\mathbf{p}_0^1) > V_{g1}(\mathbf{p}_{g1,CL}^1)$  and  $\mathbf{p}_0^1$  is chosen to prevent the final implementation of  $\mathbf{p}_{gD,CH}^1$ . However, under  $\sigma_m^3$  because of the punishment  $\sigma_m^3(\mathbf{p}_0^1) = 0$ , for the first legislator the following holds:  $V_{g1}(\mathbf{p}_{A,CL}^1) = a_{AA} - C^H + \delta(a_{AB} - C^H) > V_{g1}(\mathbf{p}_0^1) = \delta(a_{AB} - C^H)$ . Hence, the first legislator chooses  $(\mathbf{p}_{A,CL}^1)$  and the last legislator amends it passing  $(\mathbf{p}_{A,CH}^1)$ . Since for the median voter  $v_m^1(\mathbf{p}_{A,CH}^1) < v_m^1(\mathbf{p}_0^1)$  clearly  $V_m(\cdot, \sigma_m^3) < V_m(\cdot, \sigma_m^*)$ .

Since the previous voting strategies will not be played in equilibrium, then from the

preference ordering  $v_m^1(\mathbf{p}_{A,CH}^1) < v^1(\mathbf{p}_0^1) < v_m^1(\mathbf{p}_{A,CL}^1)$  the same is true for:

$$\begin{aligned}\sigma_m^4 &= [\sigma_m^4(\mathbf{p}_{A,CH}^1) = 1, \sigma_m^4(\mathbf{p}_{A,CL}^1) = 0, \sigma_m^4(\mathbf{p}_0^1) = 1] \\ \sigma_m^5 &= [\sigma_m^5(\mathbf{p}_{A,CH}^1) = 1, \sigma_m^5(\mathbf{p}_{A,CL}^1) = 0, \sigma_m^5(\mathbf{p}_0^1) = 0] \\ \sigma_m^6 &= [\sigma_m^6(\mathbf{p}_{A,CH}^1) = 0, \sigma_m^6(\mathbf{p}_{A,CL}^1) = 0, \sigma_m^6(\mathbf{p}_0^1) = 1] \\ \sigma_m^7 &= [\sigma_m^7(\mathbf{p}_{A,CH}^1) = 1, \sigma_m^7(\mathbf{p}_{A,CL}^1) = 1, \sigma_m^7(\mathbf{p}_0^1) = 0]\end{aligned}$$

■

## 6.2 Noise voters

In this section we consider the effect of introducing noise voters, i.e. voters who respond to non-policy relevant features of the candidates, and show that the median voter continues to be able to discipline the legislator(s) in the first period. To that end, let  $\gamma^H$  be the fraction of rational voters voting for  $A$  when  $\mathbf{p}_{A,CH}^1$  is chosen in the first period, and let  $\gamma^L$  be the fraction of rational voters voting for  $A$  when  $\mathbf{p}_{A,CL}^1$  is implemented in the first period. Given the median voter's preferences, we know that  $\gamma^H < \frac{1}{2}$ , while  $\gamma^L \geq \frac{1}{2}$ . Let  $\eta$  be a symmetrically distributed, zero mean random variable describing the fraction of noise voters in the population, and let  $F(\eta)$  be its cumulative distribution function. Denote  $\underline{\eta} = \frac{1}{2} - \gamma^L$  and  $\bar{\eta} = \frac{1}{2} - \gamma^H$ . From the symmetry of the distribution it is immediately clear that

$$Prob(\eta \geq \underline{\eta}) = 1 - F(\underline{\eta}) \geq \frac{1}{2} \quad (16)$$

$$Prob(\eta \geq \bar{\eta}) = 1 - F(\bar{\eta}) < \frac{1}{2} \quad (17)$$

where  $Prob(\eta \geq \underline{\eta})$  can be interpreted as the probability that the median voter is able to successfully reward legislator  $A$ , while  $Prob(\eta \geq \bar{\eta})$  represents the probability that he will be unsuccessful in punishing legislator  $A$ . The conditions necessary for the median voter to be able to discipline legislator  $A$  in the first period are then summarized in the following

**Lemma 6** *Let  $\eta$  be the fraction of noise voters. In the first period, legislator  $A$  prefers policy  $\mathbf{p}_{A,CL}^1$  if and only if  $\beta_A^1 < [F(\bar{\eta}) - F(\underline{\eta})][\beta_A^2 + \frac{\delta(a_{AA} - a_{AB})}{\pi}] + \frac{C^H}{\pi}$ .*

**Proof.** Notice that with noise voters,

$$V_A(\mathbf{p}_{A,CH}^1, \cdot) = a_{AA} + \beta_A^1 \pi - C^H + \delta\{[1 - F(\bar{\eta})][a_{AA} + \beta_g^2 \pi - C^H] + F(\bar{\eta})[a_{AB} - C^H]\}$$

$$V_A(\mathbf{p}_{A,CL}^1, \cdot) = a_{AA} + \delta\{[1 - F(\underline{\eta})][a_{AA} + \beta_A^2 \pi - C^H] + F(\underline{\eta})[a_{AB} - C^H]\}$$

and  $V_A(\mathbf{p}_{A,CL}^1, \cdot) \geq V_A(\mathbf{p}_{A,CH}^1, \cdot)$  if and only if  $\beta_A^1 < [F(\bar{\eta}) - F(\underline{\eta})][\beta_A^2 + \frac{\delta(a_{AA} - a_{AB})}{\pi}] + \frac{C^H}{\pi}$ . ■

Lemma 6 highlights how our main result, i.e. the fact that legislator A can be kept accountable by the median voter, is robust to the introduction of noise voters. Notice though that since  $0 < [F(\bar{\eta}) - F(\underline{\eta})] < 1$ , the minimum share of rent the legislator is willing to accept in exchange for  $\mathbf{p}_{A,CH}^1$  is lower than in the case with only rational voters.

### 6.3 Proof of Theorem 2

The following lemma characterizes the second period equilibrium agreement and the minimum profit shares required to implement the high cost policy in the first period under restricted and unrestricted amendment rights:

**Lemma 7** *Suppose that  $q(1 - q)^{D-1} \geq \frac{C^H}{\pi}$ . In period  $t = 2$  the policy  $\mathbf{p}_{A,CH}^2$  is chosen and each legislator obtains  $\beta_{g_d}^2 = Rq(1 - q)^{d-1} + g(d, R)\delta q$  where  $d = 1, \dots, D$ . In period  $t = 1$  the minimum share required by each legislator  $g_d$  to choose policy  $\mathbf{p}_{A,CH}^1$  is  $\bar{\beta}_{g_d}^1 = R\delta q(1 - q)^{d-1} + g(d, R)\delta q + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi} \forall d \geq 1$ .*

**Proof.** In  $t = 2$ , since  $v_{g_d g}^2(\mathbf{p}_{g,CL}^2) > v_{g_d g}^2(\mathbf{p}_0^t)$ , in the absence of lobby transfers the first legislator chooses  $\mathbf{p}_{g,CL}^2$  and the successive  $d > 1$  legislators ratify this choice. If amendment rights are restricted ( $R = 1$ ), once policy  $\mathbf{p}_{g,CL}^2$  is chosen by the first legislator, it can be amended to  $\mathbf{p}_{g,CH}^2$  only if all legislators, including the first, approve the change. In the last stage  $n$  the legislator  $g_D$  and the lobby  $l$  make take-it-or-leave-it offers with probability  $q$  and  $1 - q$ , and the agreement  $\mathbf{x}_n^2 = (\mathbf{p}_{g,CH}^2, T_{l, g_D}^2 = q\pi_{g_{D-1}})$  is reached provided that  $q\pi_{g_{D-1}} \geq C^H$ , where  $\pi_{g_{D-1}}$  is the profit available to the lobby after she reached the agreement with the previous legislator  $g_{D-1}$ . Moving backward, during the first round of negotiation between  $l$  and  $g_D$ ,  $l$  offers  $(\mathbf{p}_{g,CH}^2, q\pi_{g_{D-1}})$  and  $g_D$  accepts. Similarly, during the first round of negotiation between  $l$  and any  $g_d$ ,  $l$  offers  $(\mathbf{p}_{g,CH}^2, q\pi_{g_{d-1}})$  and  $g_d$  accepts. Note that after each agreement with a legislator  $d$  the lobby is left with a profit  $(1 - q)^{d-1}\pi$  that she can share with the subsequent legislator. Hence, each legislator obtains a share  $q(1 - q)^{d-1}$ . Given

that we have assumed that  $q(1-q)^{D-1} \geq \frac{C^H}{\pi}$  then each legislator accepts the agreement  $\mathbf{x}^2 = (\mathbf{p}_{g,C^H}^2, T_{lg_d}^2 = q(1-q)^{d-1}\pi)$  because the transfer exceeds his reservation value  $C^H$ . When amendment rights are unrestricted ( $R = 0$ ), if the policy  $\mathbf{p}_{g_d C^L}^2$  is chosen by all legislators  $d < D$ , the lobby can still obtain  $\mathbf{p}_{g_d C^H}^2$  by just paying  $\beta_{g_d}^2 = q\pi$  to the last legislator  $g_D$ . Hence, the lobby will offer  $\mathbf{x}_{g_d}^2 = (\mathbf{p}_{g_d C^L}^2, T_{lg_d}^2 = 0)$  to  $g_d$  with  $d < D$  who will accept because  $v_{g_d g}^2(\mathbf{p}_{g_d C^L}^2) > v_{g_d g}^2(\mathbf{p}_0^t)$ , and  $\mathbf{x}_{g_D}^2 = (\mathbf{p}_{g_D C^H}^2, T_{lg_D}^2 = q\pi)$  to the last legislator  $g_D$  who accepts. In  $t = 1$  for each legislator  $g_d$  the payoff from  $\mathbf{p}_{A,C^H}^1$  is  $V_{g_d}(\mathbf{p}_{A,C^H}^1, T_{lg_d}^1, \cdot) = a_{AA} + \beta_{g_d}^1 \pi - C^H + \delta(a_{AB} - C^H)$  and the payoff from  $\mathbf{p}_{A,C^L}^1$  is  $V_{g_d}(\mathbf{p}_{A,C^L}^1, \cdot) = a_{AA} + \delta(a_{AA} + \beta_{g_d}^2 \pi - C^H)$ . Since  $\beta_{g_d}^2 = Rq(1-q)^{d-1} + g(d, R)\delta q$ , we find that  $V_{g_d}(\mathbf{p}_{A,C^H}^1, T_{lg_d}^1, \cdot) \geq V_{g_d}(\mathbf{p}_{A,C^L}^1, \cdot)$  if and only if  $\beta_{g_d}^1 \geq R\delta q(1-q)^{d-1} + g(d, R)\delta q + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi}$ . ■

We are now ready to prove theorem 2.

**Proof.** When  $R = 1$  given that  $\mathbf{p}_{A,C^H}^1$  is the best policy for the lobby group,<sup>23</sup> if the sum of the minimum shares is feasible ( $\sum_{d=1}^D \bar{\beta}_{g_d}^1 \leq 1$ ) then  $\mathbf{p}_{A,C^H}^1$  is chosen. On the other hand, if  $\sum_{d=1}^D \bar{\beta}_{g_d}^1 > 1$  then  $V_{g_d A}(\mathbf{p}_{A,C^H}^1, \cdot) < V_{g_d A}(\mathbf{p}_0^1, \cdot) < V_{g_d A}(\mathbf{p}_{A,C^L}^1, \cdot) \forall d$  implies that  $\mathbf{p}_{A,C^L}^1$  is chosen. Consider now the case where  $R = 0$ . The last legislator will exert his amendment right only if there is a feasible agreement he prefers over the initial agreement reached by the lobby and the previous legislators. Again, as  $\mathbf{p}_{A,C^H}^1$  is the best policy for the lobby group when  $\sum_{d=1}^D \bar{\beta}_{g_d}^1 \leq 1$ , then from lemma 7 we know that  $\mathbf{p}_{A,C^H}^1$  is chosen by  $g_d$  with  $d < D$ , and is ratified by the last legislator  $g_D$ . On the other hand, if the transfer necessary to induce  $g_D$  to choose  $\mathbf{p}_{A,C^H}^1$  is not feasible, i.e. if  $\bar{\beta}_A^1 > 1$ , then  $\mathbf{p}_{A,C^L}^1$  is chosen. Suppose now that the sum of the equilibrium transfers required by the  $D$  legislators exceeds the lobby profit,  $\delta q + D[\frac{C^H + \delta(a_{AA} - a_{AB})}{\pi}] > 1$ , but that each individual transfer is less than the profit,  $\delta q + \frac{C^H + \delta(a_{AA} - a_{AB})}{\pi} < 1$ . In this case, the first legislator could choose  $\mathbf{p}_{g,C^H}^1$  if he is offered the appropriate transfer. However, given that legislators  $d > 1$  cannot all be offered the transfer necessary to pass  $\mathbf{p}_{g,C^H}^1$ , the lobby will not find it optimal to carry out the transfer necessary to obtain  $\mathbf{p}_{g_1,C^H}^1$  in the first legislative step, knowing that this proposal will be overridden by some of the subsequent legislators. As a consequence, the lobby offers  $(\mathbf{p}_{g_1,C^L}^1, T_{lg_1}^1 = 0)$  to the first legislator, who will then decide whether to choose  $\mathbf{p}_{g_1,C^L}^1$  or to abstain ( $\mathbf{p}_0^1$ ). Since the first legislator anticipates that  $\mathbf{p}_{g_1,C^L}^1$  will be overridden by the last legislator who can receive the appropriate rent share for choosing  $\mathbf{p}_{g_D,C^H}^1$ , and  $V_{g_1 A}(\mathbf{p}_0^1) \geq V_{g_1 A}(\mathbf{p}_{A,C^H}^1) \forall \delta \geq \hat{\delta}$ ,

<sup>23</sup>Remember that we are assuming that  $\beta_l^1 \geq \delta(\frac{a_{lA} - a_{lB}}{\pi})$ .

then  $g_1$  chooses  $\mathbf{p}_0^1$  since by assumption  $1 - \delta \geq \hat{\delta}$ . ■

## References

- Banks, J. and R. Sundaram (1998). Optimal retention in agency problems. *Journal of Economic Theory* 82, 293–323.
- Baron, D. and J. Ferejohn (1989). Bargaining in legislatures. *American Political Science Review* 83, 1181–1206.
- Besley, T. and S. Coate (1997). An economic model of representative democracy. *Quarterly Journal of Economics* 112, 85–114.
- Besley, T. and S. Coate (2001). Lobbying and welfare in a representative democracy. *Review of Economic Studies* 68, 67–82.
- Besley, T. and S. Coate (2003). Elected versus appointed regulators: Theory and evidence. *Journal of the European Economic Association* 1, 1176–1206.
- Cardona-Coll, D. and F. M. Mancera (2000). Demand bargaining in legislatures. *Economic Theory* 16, 163–180.
- Coate, S. and S. Morris (1995). On the form of transfers to special interests. *Journal of Political Economy* 103, 1210–1235.
- Denzau, A. and M. Munger (1986). Legislators and interests groups: How unorganized interests get represented. *American Political Science Review* 80, 89–106.
- Diermeier, D. and R. B. Myerson (1999). Bicameralism and its consequences for the internal organization of legislatures. *American Economic Review* 89, 1182–1196.
- Fauli’-Oller, R., E. A. Ok, and I. Ortuno-Ortin (2003). Delegation and polarization of platforms in political competition. *Economic Theory* 22, 289–309.
- Ferejohn, J. (1986). Incumbent performance and electoral control. *Public Choice* 50, 5–25.
- Gomberg, A. M., F. Marhuenda, and I. Ortuno-Ortin (2004). A model of endogenous political party platforms. *Economic Theory* 24, 373–394.
- Groseclose, T. and J. Snyder (1996). Buying supermajorities. *American Political Science Review* 90, 303–315.

- Grossman, G. M. and E. Helpman (1996). Electoral competition and special interests politics. *Review of Economic Studies* 63, 265–286.
- Madison, J. (1788). Federalist Paper 62. In J. Jay, A. Hamilton, and J. Madison (Eds.), *The Federalist or the new Constitution*. London: Everyman Edition.
- Osborne, M. and A. Slivinski (1996). A model of political competition with citizen candidates. *Quarterly Journal of Economics* 111, 65–96.
- Persson, T., G. Roland, and G. Tabellini (1997). Separation of powers and political accountability. *Quarterly Journal of Economics* 112, 1163–1202.
- Testa, C. (2003a). Bicameralism and corruption. DEPS 41, STICERD-LSE.
- Testa, C. (2003b). Do candidates serve party interests? Party polarisation as a discipline device. Discussion paper 2003-13, Royal Holloway.