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## FISCAL CONSTITUTIONS

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## FISCAL CONSTITUTIONS

### Abstract

In this paper we examine how individuals should be treated with respect to taxes, subsidies and agenda setting in constitutions in order to obtain efficient allocations of public goods and to limit tax distortions. We show that if public goods are socially desirable, the simple majority rule as well as taxation constrained to majority winners or a ban on subsidies are second-best constitutions. Equal treatment regarding taxes and subsidies is undesirable. Super majority rules and equal treatment of all citizens with respect to taxes and subsidies, however, is first-best if public goods are socially undesirable. The ex ante expectation of the share and welfare improvements of socially efficient public goods determines which constitution a society will adopt.

Keywords: Incomplete social contracts, constitutions, treatment rules, majority rules

JEL Classification: D70, H41, K12

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# 1 Introduction

In this paper we develop constitutional principles for democracies on how to treat individuals when a society decides on public good provision and financing. Democratic constitutions allow equal voting and agenda rights for all citizens. At the same time they should ensure that socially valuable public goods are provided. Socially undesirable public goods and tax/subsidy proposals for solely redistributive purposes creating dead weight losses should not be adopted. And this must hold whether or not the agenda setter is a winner or a loser of the public good. We examine the design of constitutions involving decision rules and treatment rules with respect to taxes and subsidies in order to achieve these intertwined objectives.

At the constitutional stage, a society decides how public good provision and financing should be governed in the legislative periods under a veil of ignorance. Individuals do not know at the constitutional stage whether they will benefit from the public good. Beneficiaries at the legislative stage are called project winners. Those individuals who suffer from the public good are called project losers. In many cases, the set of project losers can be empty. In many other cases, public goods or more general public projects can affect part of the society negatively. Examples of the latter category are the scale back of the defense industry after the end of the cold war, labor market reforms that put pressure on wages for some workers or the construction of roads which may increase the noise for the residents living close to the road. A priori there is no reason to assume that there are no project losers.

The constitutional principles in this paper must obey liberal democracy's fundamental principles of equal voting and agenda rights. Moreover, constitutional principles cannot require more messages or information of citizens than proposals or voting including the possibility of non-participation. Given these democratic constraints we consider the following potential constitutional principles that are at the disposition of the society. Decision rules can be  $m$  percent majority rules with  $\frac{1}{2} \leq m \leq 1$ . We assume open ballots dividing individuals into majority winners and minority losers ex post. Therefore, taxation or subsidization can be constrained to winners or losers of the majority voting process. Majority winners or losers may be treated equally with respect to net transfers (taxes/subsidies). Whether or not these last two rules violate the constitution can only be determined after voting has taken place. Similarly, equal treatment with respect to taxes, subsidies or net transfers

can be restricted to a certain percent of the population or a certain portion of the winning majority or losing minority. Finally, we assume as the fundamental democratic rights that each voter has the same voting and agenda rights. In the legislative stage, an agenda setter is chosen randomly and offers a proposal that specifies whether a public good should be adopted and who should pay taxes or should receive subsidies.

Our main results are as follows: First, when public goods are socially efficient, the simple majority rule combined with taxation constrained to majority winners and to half of the population or a ban on subsidies are second-best constitutions. Such constitutions prevent simple redistribution proposals from being adopted. They allow project winners to form a majority for the adoption of the public good without the possibility of exploiting the losers, since proposals only obey the constitutional rules if all taxed individuals vote in favor. The constitutional principles also allow project losers to form a majority for the adoption of the public good if the aggregate welfare gains are sufficiently high and the agenda setter can channel subsidies to himself. Equal treatment of citizens with respect to taxes and subsidies is, however, undesirable. They destroy the possibilities for a project winner to form a majority if the share of project winners is less than one half, but the public good is socially desirable. Moreover, a project loser never has an incentive to propose a socially desirable public good.

Second, super majority rules and equal treatment of all citizens with respect to taxes and subsidies is first-best if public goods are socially undesirable. Super majority rules ensure that more than the share of project winners is needed for the approval of a public good. Strict equal treatment rules with respect to taxes and subsidies make it impossible for a project loser to gain from the adoption of the public good. Super majority rules in conjunction with equal treatment rules ensure that no majority can be formed for the adoption of socially inefficient projects or for simple redistribution proposals.

Third, the ex ante expectation of the share and welfare improvements of socially efficient projects determines which constitution of the above three possibilities societies will choose at the constitutional stage.

The paper follows the important contributions of Buchanan and Tullock (1969) on the design of constitutions and of Aghion and Bolton (1998) who recently intro-

duced the incomplete contract approach to constitutional design. Following a long tradition started by Rousseau (see Harsanyi (1955), Mirrless (1971) and also Wicksell (1896)), Buchanan and Tullock (1969) have examined which constitutional rules would be chosen behind a veil of ignorance (see also Rae (1969), Taylor (1969), Rawls (1971)). We use the model of Aghion and Bolton (1998) which builds on Romer and Rosenthal (1983), Laffont (1995). Aghion and Bolton (1998) show that simple or super majority rules can be optimal because it can help to overcome ex-post vested interests. We extend their model in order to consider constitutional treatment rules for agenda setting, taxation and subsidization chosen behind the veil of ignorance.

Our paper is also related to a large literature on optimal collective decision rules and to the majoritarian logic (Buchanan, 1998). A strand of literature has singled out the super majority rule (Caplin and Nalebuff, 1988) as the most preferred rule for ex post collective decisions in order to avoid Condorcet cycles (see, however, Dasgupta and Maskin, 1997). In our paper, we consider how majority rules can be improved by treatment rules with respect to taxes, subsidies and agenda setting.

The paper is organized as follows: In the next section, we outline the model and define the range of available treatment rules. In section 3, we derive the main results for different constellations of projects and sizes of the group benefiting from public goods. In section 4, we consider the rule that agenda setting must yield a proposal for change. In the last section, we discuss optimal constitutions in all cases. We conclude with issues for further research.

## 2 Model and Treatment Rules

### 2.1 Model

The basic structure of our model follows Aghion and Bolton (1998). We consider a standard social choice problem of public good provision and financing. Time is indexed by  $t = 0, 1$ . The first period  $t = 0$  is the constitutional period. In the constitutional period, a society of  $N$  risk-neutral members decides how public good provision and financing should be governed in future legislative periods. We assume that  $N$  is odd and large. Citizens are indexed by  $j \in \{0, 1, \dots, N\}$ .

In the legislative period  $t = 1$ , each citizen is endowed with a private consumption good, denoted by  $e$ . The community can produce a public good  $g$ . Let  $c_j$  denote the agent  $j$ 's utility from consumption of public good  $g$ . For simplicity of presentation, we assume that  $c_j$  can take two values,  $c_j = C_h > 0$  and  $c_j = C_l \leq 0$ , so that the citizens can be divided into winners and losers. We assume that  $c_j$  is a private benefit that cannot be taxed.<sup>1</sup> The ex-ante probability that any one citizen belongs to the winning group in the legislative period, and hence has  $C_h$ , is denoted by  $p$ .  $C = pC_h + (1 - p)C_l$  is the expected utility from the public good. By the law of large numbers,  $p$  equals the fraction of winners in each period provided that  $N$  is sufficiently large, which we assume throughout the paper. We express  $c_j$  in terms of the consumption good. We denote the supply of public good  $g$  by  $g \in \{0, 1\}$ .  $g = 1$  stands for the provision of the public good.  $g = 0$  denotes the status quo. If we denote citizen  $j$ 's subsidy by  $s_j$  and citizen  $j$ 's tax payment by  $t_j$ , the utility of citizen  $j$  in the legislative period, denoted by  $U_j$ , is given by

$$U_j = e + gc_j - t_j + s_j \tag{1}$$

We drop the index  $j$  in  $U_j$  whenever convenient.  $\tau_j = s_j - t_j$  denotes the net transfer for individual  $j$ . Finally, we denote the expected utility of citizen  $j$  at the constitutional stage by  $EU_j$ . Since citizens are identical ex ante, we can drop the index  $j$ .

Public goods are financed by taxes. We assume that taxation is distortionary. Let  $\lambda > 0$  denote the shadow cost of public funds. That is, taxation uses  $(1 + \lambda)$  of

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<sup>1</sup> If  $c_j$  were a monetary return it could be taxed in addition to  $e$ . The results would be unaffected by this modification.

taxpayer's resources in order to levy an amount of 1 for public goods or for transfers to citizens. We assume that the overall cost of the public good per capita is given by  $k > 0$ . The budget constraint of the society in the legislative period is given by

$$\sum_{j=1}^N t_j = Nk(1 + \lambda)g + (1 + \lambda) \sum_{j=1}^N s_j \quad (2)$$

It is socially efficient to produce the public good if and only if

$$C = pC_h + (1 - p)C_l > k(1 + \lambda) \quad (3)$$

Throughout the paper, we assume that the maximum amount of resources that can be levied through taxation is sufficient to finance the public good:

$$e > k(1 + \lambda) \quad (4)$$

Moreover, we assume that  $e > C_h$  and hence the benefits from the public project do not exceed the income of the individuals. This assumption simplifies the exposition, since we do not need to always distinguish whether  $e > C_h$  or  $e < C_h$ .

## 2.2 The Game

The sequence of events is summarized as follows:

Stage 1: In the constitutional period, the society unanimously decides upon the constitutional principles governing legislative decision making.

Stage 2: At the start of the legislative period, each citizen  $j$  observes the realization of  $c_j$ .

Stage 3: A citizen  $j$  is randomly determined to set the agenda. The agenda setter proposes a project/financing package  $(g, t_j, s_j)$ .

Stage 4: The nation decides whether to accept or reject the proposal according to the constitutional decision rule.

Note that at the voting stage individuals know who will be taxed and who will receive subsidies if a proposal is accepted. The constitutional principles will be

introduced in the next section. Given a constitution with a set of principles agreed unanimously upon in stage 1, we look at subgame perfect implementation in stages 2 to 4. The expected utility obtained under the rules of a constitution are the payoffs of a subgame perfect equilibrium in stages 2 to 4. We make the following assumption. Individuals in stage 4 do not choose weakly dominated voting strategies. This standard assumption allows us to eliminate weakly dominated voting strategies and voting equilibria will become unique. Moreover, this assumption will allow us to derive expected utility from a constitution as the payoff of a unique subgame perfect equilibrium and thus will make the comparison of constitutions clear-cut. Moreover, to simplify description, we assume two tie-breaker rules in case of indifferences. First, if a proposal maker is indifferent between proposing the public good and the status quo, he will propose the change. Second, an individual who is indifferent between a new proposal and the status quo will vote for a change.<sup>2</sup>

### 2.3 Constitutional Principles

At the constitutional stage, the society decides about the rules governing the legislative processes. We follow the incomplete contract setting of Aghion and Bolton (1998) and assume that it is impossible to write a complete state contingent public good supply plan at the constitutional stage. Future states cannot be described precisely and therefore constitutions can only specify non-contingent rules. Whether an individual is a winner or a loser of the project can be observed by other citizens at the legislative stage. For instance, if the project is a new road, people observe that people close to the road will suffer because of more noise and others will benefit because they have an easier access to their work place. Following the insights from the incomplete contract literature, such observations, however, are not contractible and cannot be used in constitutional contracts and therefore not in constitutional rules. We assume open ballots; hence, individuals can be divided into the majority winners and minority losers *ex post*. In order to avoid ambiguous terms we will distinguish between project winners (losers) and majority winners (losers).

Given the incomplete nature of constitutions, the question is which type of constitutional principles can be considered. The restrictions on feasible constitutions are

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<sup>2</sup> Without such a tie breaking rule, we would face the standard problem that no equilibrium in pure strategies exists. This additional technical complexity does not appear to provide more insights.



based on the following twin principles. First, every constitution or constitutional principle must allow for equal voting and agenda rights as the fundamental democratic principles. An immediate consequence is that every individual should have the same chance to determine the agenda. Furthermore, decision rules whether to adopt a change of the status can only depend on the number of votes for a change and not on the persons voting in favor or against the status quo. Second, while traditional mechanism design allows for arbitrary set of messages that can be required from individuals, the democratic principles cannot require more information of citizens than a proposal, which may be the status quo itself and thus no real proposal, and voting with the possibility of non-participation. Given these democratic constraints on constitutions we can think of the following set of constitutional principles:

**P1:** *Decision Rules*

- $m$ -majority rules:

If a proposal to change the status quo receives a majority of  $m$  percent of the citizens ( $\frac{1}{2} \leq m \leq 1$ ), the proposal is adopted.

**P2:** *Constraint of Taxation or Subsidization*

- Constraint of taxation to majority winners or losers (CTW, CTL, respectively):

Only majority winners or losers can be taxed.

- Constraint of taxation to  $\alpha$  ( $0 \leq \alpha \leq m$ ) percent of individuals belonging to the winning majority ( $CTW(\alpha)$ ): Only  $\alpha$  percent of individuals in the population belonging to the winning majority can be taxed.

- Constraint of subsidization to majority winners or losers (CSW, CSL, respectively):

Only majority winners or losers of the voting process can receive subsidies.

- Constraint of subsidization to  $\alpha$  ( $0 \leq \alpha \leq 1 - m$ ) percent of individuals belonging to the losing minority ( $CSL(\alpha)$ ).

**P3:** *Equal Treatment Rules for all Individuals*

- Equal treatment of individuals with respect to taxes (ETT):

$$t_j = t_k \text{ for all } k \neq j.$$

- Equal treatment of individuals with respect to subsidies (ETS):

$$s_j = s_k \text{ for all } k \neq j.$$

**P4:** *Equal Treatment Rules for Majority Winners and Majority Losers*

- Equal treatment of winner (ETW):

For two members  $j \neq k$  of the winning majority, the net transfers fulfill:

$$\tau_j = s_j - t_j = s_k - t_k$$

- Equal treatment of  $\alpha$  ( $0 \leq \alpha \leq m$ ) percent of individuals of the population in the winning majority (ETW( $\alpha$ )):

For  $\alpha$  percent of individuals in the population in the winning majority, the net transfer of two members  $j \neq k$  must fulfill:

$$\tau_j = s_j - t_j = \tau_k = s_k - t_k$$

- Equal treatment of losers (ETL):

For any two members  $j \neq k$  of the loosing minority, the net transfer must fulfill:

$$\tau_j = s_j - t_j = \tau_k = s_k - t_k$$

- Equal treatment of  $\beta$  percent of all individuals in the loosing minority (ETL ( $\beta$ )):

For  $\beta$  percent of individuals in the loosing minority, the net transfer of two members  $j \neq k$  must fulfill:

$$\tau_j = s_j - t_j = \tau_k = s_k - t_k$$

**P5:** *Equal Agenda and Voting Rights (EAVR)*

- Equal agenda rights (EAR):

Every individual has the same chance of being recognized as an agenda setter.

- Equal voting rights (EVR):

Every individual has one vote.

While the principles  $P1$  to  $P5$  satisfy the democratic constraints, it is not apriori clear that these principles exhaust all treatment possibilities. While a formal proof is not in reach, we think that the taxonomic approach provides a first step towards improving fiscal constitutions by considering treatment rules.

A second-best constitution is a set of principles from  $P1$  to  $P5$  which yields higher expected utility in the subgame perfect implementation than any other constitution. Since EAVR constitutes the basic principle of liberal democracies, we will assume that every constitution must contain EAVR.<sup>3</sup>

It is important that the violation of the constitution can occur at two stages. After stage 3, a proposal may violate some of the treatment rules. In this case, the proposal is unconstitutional and the status quo prevails. After stage 4 and voting, the principles  $P2$  and  $P4$  may need to be checked. Whether or not  $P2$  and  $P4$  violate the constitution depends on the voting itself. For instance, suppose  $CTW$  and  $g = 1$  has been adopted. If a taxed individual has voted no and is in the minority,  $CTW$  is violated. Again, if one constitutional principle after stage 4 is violated, the status quo prevails. Since agenda setters can always benefit from making a proposal in agreement with the constitution, no agenda setter would ever propose a project/financing package that violates the constitution in equilibrium.

We next observe that it is generally impossible to implement a first-best constitution. Since it is not verifiable whether an individual is a project winner or a project loser, there is always a possibility that a loser can determine the agenda. He will never propose the public project as long as he is not sufficiently compensated. Every compensation, however, creates distortionary losses and is therefore inefficient from an ex-ante view.

## 2.4 Socially Efficient Solutions

It is obvious that the socially optimal solution from an ex ante point of view is given by  $g = 1$  if expected benefits are larger than per capita taxes including distortions. Moreover, the socially efficient tax scheme should only allow money to be raised for the financing of the public good, since any redistribution activities are waste from an ex ante point of view. The socially efficient tax schedule is indeterminate since citizens are risk neutral. For instance, a socially efficient scheme is  $t = \frac{k(1+\lambda)}{p}$  for

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<sup>3</sup> EAVR can also be justified by narrow economic arguments [see Gersbach 1992].

all project winners and  $t = 0$  for all project losers as well as for every individual  $s_j = 0$ . Hence, all beneficiaries of the public good pay a tax of  $\frac{k(1+\lambda)}{p}$  to cover the resource costs. No subsidies should be paid. In order to implement such a socially optimal solution, a complete social contract would be necessary. We summarize the first-best solution [see Aghion and Bolton 1998] as follows.

**Proposition 1**

*A first-best allocation is given by:*

- (i) *If  $C \geq k(1+\lambda)$  then  $g = 1$ ,  $s_j = 0 \quad \forall j$ ,  $t = \begin{cases} \frac{k(1+\lambda)}{p} & \text{for project winners} \\ 0 & \text{for project losers} \end{cases}$*
- (ii) *If  $C < k(1 + \lambda)$  then  $g = 0$ ,  $t_j = s_j = 0 \quad \forall j$ .*

*Expected utility for each individual is given by:  $EU = g(C - k(1 + \lambda))$*

In the following we assume that complete social contracts cannot be written. Private benefits of individuals are observable at the legislative stage, but are not verifiable and hence cannot be used in social contracts. As it is standard in the incomplete contracting literature, constitutions can only specify state independent rules as expressed in the constitutional principles  $P1$  to  $P5$ .

### 3 Second-best Constitutions

We next examine the second-best constitutions when no complete social contracts can be written and EAVR is a given constitutional principle. A second-best constitution is defined as a set of constitutional principles that yields a higher expected utility in the subgame perfect equilibrium in stages 2 to 4 than any other combination of principles from  $P1$  to  $P5$ . Due to EAVR, every citizen has the same chance of being recognized as an agenda setter. If a citizen, denoted by  $ag$ , is determined as the agenda setter, two cases can occur: either  $c^{ag} = C_h$  or  $c^{ag} = C_l$ . In both cases, the agenda setter wants to create the smallest possible majority for an adoption or rejection of the public good combined with the most favorable tax/subsidy package for him. The constitutions should ensure that no agenda setter simply proposes a tax/subsidy package to redistribute income without proposing a socially efficient project. In the following we derive second-best constitutions under various assumptions concerning the project returns.

#### 3.1 Optimal Constitutions for Socially Efficient Projects

We first look at optimal constitutions assuming that it is socially efficient to produce the public good from the perspective of the first-best allocation. We begin by describing a constitution which ensures that only project winners are taxed, and every agenda setter proposes  $g = 1$ .

**Proposition 2**

*Suppose that  $p > \frac{1}{2}$ . Moreover, suppose*

$$C = pC_h + (1 - p)C_l > k(1 + \lambda) \tag{5}$$

$$\frac{1}{2}C_h > k(1 + \lambda) \tag{6}$$

*Then, under the constitution*

*(i) simple majority rule (1/2-majority rule),*

*(ii) CTW (50%)*

*both project winners and project losers propose  $g = 1$ .*

*Expected utility for each individual is given by:*

$$EU = C - k - \frac{\lambda(N - 1)C_h}{2N(1 + \lambda)}$$

The proof is given in the appendix. The point of proposition 2 is that, from behind a veil of ignorance, agents agree that only majority winners and at most half of the population can be taxed. The condition  $\frac{1}{2}C_h > k(1 + \lambda)$  ensures that a project loser is better off by taxing those 50% of the population that are project winners and by proposing  $g = 1$ . The excess revenues of taxation are channeled to the agenda setter as a subsidy. He will not subsidy any project winner in his majority coalition. Due to CTW(50%) he cannot form a majority that would support a simple redistribution proposal. Note that a taxed project winner could make a proposal  $g = 1$  unconstitutional by voting against  $g = 1$ . This would lead to the status quo which, however, does not improve the utility of the defecting project winner. Therefore, no member of the winning majority has an incentive to switch. Moreover, because of CTW(50%), a project loser cannot make a proposal unconstitutional by voting strategically and supporting  $g = 1$ .

It is not yet clear in which circumstances the constitution in proposition 2 is indeed a second-best constitution. In the next proposition we consider an alternative constitution that avoids any subsidization and that will provide the appropriate comparison.

**Proposition 3**

*Suppose  $p > \frac{1}{2}$  and  $C > k(1 + \lambda)$ . Then, there exists a constitution with:*

- (i)  $\frac{1}{2}$ -majority rule
- (ii) CTW
- (iii) CSL (0%)

*where the project winners propose  $g = 1$  and project losers propose  $g = 0$ . No taxation for redistribution purposes occurs. Expected utility for each individual is given by:*

$$EU = p(C - k(1 + \lambda))$$

**Proof :**

Suppose that the agenda setter is a project winner. He cannot generate any subsidies for himself because CSL (0%) acts as a general ban on subsidies. But he benefits from the public project. Because of  $p > \frac{1}{2}$ , he can tax all project winners except

himself by the uniform tax rate  $t = (1 + \lambda) \left( \frac{N}{pN-1} \right) k$ . Since  $C > k(1 + \lambda)$  and  $C_l \leq 0$  we have  $C_h > \frac{k(1+\lambda)}{p}$ . Hence, for sufficiently large  $N$  we have  $C_h > t$  and therefore all project winners will support the proposal. Project losers vote no, but the proposal will be adopted. Suppose that a project loser determines the agenda. Because he cannot generate any subsidies for himself and loses from  $g = 1$ , he cannot do better than proposing  $g = 0$  and  $t = 0$  for all individuals. Therefore, since no subsidies are generated, expected utility is equal to  $EU = p(C - k(1 + \lambda))$ . ■

In the next step we compare the constitutions in the last proposition. We obtain

**Proposition 4**

Suppose  $p > \frac{1}{2}$ ,  $C > k(1 + \lambda)$  and  $\frac{1}{2}C_h > k(1 + \lambda)$ . Then

(i) The constitution  $\{\frac{1}{2}$ -majority rule,  $CTW$  (50%) $\}$  is the second-best if

$$C(1 - p) > k(1 - p(1 + \lambda)) + \frac{\lambda}{2(1+\lambda)}C_h$$

(ii) The constitution  $\{\frac{1}{2}$ -majority rule,  $CTW, CSL$  (0%) $\}$  is second-best if

$$C(1 - p) < k(1 - p(1 + \lambda)) + \frac{\lambda}{2(1+\lambda)}C_h$$

**Proof :**

The comparison of the expected utilities under both conditions leads to the inequality in the first and second statement. We have used that  $\frac{N-1}{2N}$  is approximately  $\frac{1}{2}$  for sufficiently large  $N$ . Finally, one has to check that no other combination of constitutional principles, including  $EAVR$ , can generate higher expected utility. Whatever combination of principles from  $P1$  to  $P6$ , one cannot decrease the subsidies a project loser receives if he should propose  $g = 1$ . If he should not propose  $g = 1$ , then it is obvious that the constitution  $\{\frac{1}{2}$ -majority rule,  $CTW, CSL$  (0%) $\}$  is the second-best because subsidization is completely avoided. ■

The more valuable the public good, the easier it will be to fulfill the condition in the last proposition for the second-best constitution  $\{\frac{1}{2}$ -majority rule,  $CTW$  (50%) $\}$ , i.e., the larger  $C$  is relative to costs  $k$  and tax distortions  $\lambda$ .

The constitution  $\{\frac{1}{2}$ -majority rule,  $CTW$  (50%) $\}$  is inefficient if the inequality (6) does not hold, but inequality (5) holds since losers or winners recognized as agenda

setters will not propose socially desirable public goods because the tax revenues from half of the population is not sufficient to finance the project. A modified constitution can ensure that socially efficient projects are undertaken in this case.

**Proposition 5**

Suppose  $p > \frac{1}{2}$ . Moreover, suppose

$$C > k(1 + \lambda),$$

then a constitution exists that ensures that socially efficient projects are undertaken:

- (i)  $\frac{1}{2}$  – majority rule,
- (ii) *CTW*

Both project winners and project losers propose  $g = 1$ .

The proof is given in the appendix. The constitutional rules in proposition 5 allow a project loser to tax all project winners which, in turn, generates enough subsidies to compensate the agenda setter. Note that an agenda setter will tax all project winners in the same way to maximize his subsidies. Hence all project winners will support the proposal and the  $\frac{1}{2}$ –majority rule is equivalent to a  $p$ –majority rule. Whether or not the  $\{\frac{1}{2}$ –majority rule, *CTW* constitution is second-best depends again on the comparison with the constitution  $\{\frac{1}{2}$ –majority rule, *CTW*, *CSL* (0%)}. The comparison follows the same procedure as in proposition 4 and is omitted.

We next consider the case that the fraction of winners is smaller than one half and hence a winning majority must contain project losers besides the agenda setter. We obtain

**Proposition 6**

Suppose  $p < \frac{1}{2}$ . Moreover, suppose

$$C > k(1 + \lambda) \tag{7}$$

Then, the constitution

- (i) simple majority rule,
- (ii) *CTW*,

ensures that both project winners and project losers, propose  $g = 1$ .



The proof is given in the appendix. Note that in the case of  $p < \frac{1}{2}$ , a project loser has an incentive to propose  $g = 1$  if he can tax all project winners by  $C_h$ , and tax revenues are sufficient to subsidy  $(\frac{1}{2} - p)N$  losers and the agenda setter himself so that they support  $g = 1$ . This is ensured when the project is socially efficient.

Again, the comparison with the constitution  $\{\frac{1}{2}$ -majority rule,  $CTW$ ,  $CSW$  (0%) $\}$  under which neither a project winner nor a project loser proposes a change of the status quo or a redistribution package determines whether or not the constitution  $\{\frac{1}{2}$ -majority rule,  $CTW$  $\}$  is efficient for the case  $p < \frac{1}{2}$ . This comparison for  $p < \frac{1}{2}$  follows similar considerations as in proposition (4) and is therefore omitted.

### 3.2 The Curse of Equal Treatment

Proposition 2 and 6 show that it is optimal to limit treatment clauses to subgroups of a society. If we were requiring equal treatment for all individuals, more inefficiencies would occur compared to the constitutions in the last sections.

This is shown in the following proposition.

#### Proposition 7

*Suppose*

$$C > k(1 + \lambda)$$

*Then the constitution*

- (i) *simple majority rule,*
- (ii) *ETT*
- (iii) *ETS*

*can be inefficient.*

#### **Proof :**

The inefficiency of the constitution with ETT and ETS can arise from two sources. First, suppose that a project loser determines the agenda. Because he cannot generate subsidies without paying for it himself by a larger tax, a project loser will never propose  $g = 1$ . Second, if  $p < \frac{1}{2}$ , a project winner who proposes the project must propose a uniform tax rate  $t = k(1 + \lambda)$ . However, no project loser will ever support

such a proposal, even if a project winner tried to generate subsidies. Because of *ETS*, we have  $s_j = s$  for all  $j$ , which requires a tax rate  $t = k(1 + \lambda) + s(1 + \lambda)$  for a certain subsidy level  $s$ . Hence, a majority of project losers rejects  $g = 1$ . ■

Proposition 7 illustrates the inefficiencies caused by rules that require equal treatment concerning taxes and subsidies for all individuals because socially valuable public goods cannot be implemented anymore.

### 3.3 Optimal Constitutions for Socially Inefficient Projects

The next question concerns the nature of optimal constitutions when projects are socially inefficient. We obtain:

**Proposition 8**

*Suppose that*

$$C = pC_h + (1 - p)C_l < k(1 + \lambda) \tag{8}$$

*Then, a first-best constitution exists with*

(i)  $\max\{\frac{p^{N+1}}{N}, \frac{1}{2}\}$  – majority rule,

(ii) *ETT*

(iii) *ETS*

*Both project winners and project losers propose  $g = 0$  and  $t_j = s_j = 0, \forall j$ .*

The proof is given in the appendix. Proposition 8 shows how equal treatment rules work together with super majority rules. They can eliminate any danger that inefficient public goods are proposed or produced or that simple redistribution proposals are implemented, because everybody must be treated equally with respect to taxes and subsidies.

## 4 Conclusions and Extensions

The preceding sections have provided second-best constitutions. In particular, optimal constitutions depend on whether a public good is socially efficient and on the relative size of the project winner group. While it might be possible to write a constitution for different characteristics of the public good,<sup>4</sup> naturally, one would like to design a constitution which encompasses all possible cases. It would necessarily be second-best, given a flow of efficient and inefficient projects with varying sizes of project winners. Naturally, this must be a compromise among the constitutions identified in the paper, depending on the distribution of net welfare gains or losses from public projects and of the size of project winners. Starting from our results, we can distinguish three cases. First, when the ex ante expectation of the share and welfare gains of socially valuable public goods is large, the simple majority rule and taxation constrained to majority winners and to half of the population is second-best. Second, if the share of socially desirable public goods is large, but welfare is moderate or small, the simple majority rule, constrained taxation to majority winners and a ban on subsidies appears to be second-best. Third, if the share of socially undesirable projects is large, constitutions prescribing super majority rules, strict equal treatment rules with respect to taxes and subsidies can be second-best. We expect that future research will provide detailed examples of such general second-best constitutions.

Numerous further questions arise in the context of constitutional treatment rules [see Voigt 1998 for a survey]. E.g., the question of which procedures should be considered to change constitutional treatment rules. Since treatment rules are the outcome of a voting process under a veil of uncertainty, one might think that unanimity rules should govern future constitutional changes. However, since optimal decision rules in the legislative stage depend on the size of project winners, renegotiation of constitutions without requiring unanimity may be useful [see Aghion and Bolton 1998]. Or it might be possible to make majority decision rules dependent on the number of taxed individuals. Such decision rules would vary with the number of project winners. Another unresolved issue in normative constitutional economics is the exact scope of social rights such as a right to work.

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<sup>4</sup> One could for instance design a meta constitution which contains a decision rule on how to decide among different constitutions when a specific public good has to be allocated.

An independent judiciary can cause implicit constitutional change because it has the power to judge the constitutional conformity of the actions of other government branches or individuals. The breadth of interpretation of constitutional rules left to the judiciary branch is another highly valuable topic for research.

## 5 Appendix

### Proof of proposition 2:

(A) Suppose that the agenda setter is a project winner. If he wants to implement  $g = 1$ , he must form a minimal coalition with the project winners in order to create a yes-majority. Since  $p > \frac{1}{2}$  and  $CTW(50\%)$  the agenda setter will propose  $g = 1$  and

$$t = \begin{cases} C_h & \text{for } \frac{N-1}{2} \text{ project winners} \\ 0 & \text{for remaining individuals} \end{cases}$$

$$s = \begin{cases} s_{ag} & \text{for agenda setter} \\ 0 & \text{for all remaining individuals} \end{cases}$$

Note that at the voting stage everybody knows how he is taxed or whether he receives subsidies. Thus, a project winner who is taxed can only avoid it by voting no and making the proposal unconstitutional which, however, makes him worse off and is not a best response. The subsidy for the agenda setter is

$$\frac{N-1}{2}C_h(1+\lambda)^{-1} - kN,$$

which is positive by assumption. Eliminating weakly dominated voting strategies, all project winners support the proposal and all project losers vote no. Since  $p > \frac{1}{2}$ , the proposal is adopted.

(B) Suppose that the agenda setter is a project loser. If he sets  $g = 0$ , he cannot generate any subsidies for himself. Any proposal to generate taxes would make all winners worse off because of  $CTW$ , and they would reject it. Since  $p > \frac{1}{2}$ , no majority coalition for positive taxation can be found. If a loser proposes  $g = 1$ , he must form a minimal coalition with the project winners. Suppose that he takes  $\frac{N-1}{2}$  project winners, which is the maximal size of a group he can tax. The maximal tax rate he can impose on this group of winners while they still support a project proposal is  $t = C_h$ . He can set  $s_j = 0$  for all project winners. The payoff the agenda setter receives this way is given by:

$$e + C_l + s_{ag} = e + C_l - kN + \frac{N-1}{2}C_h(1+\lambda)^{-1}$$

If he proposes  $g = 0$ , he receives  $e$ . Hence, the proposal  $g = 1$  with the derived tax and subsidy plan is profitable if

$$\frac{N-1}{2}C_h > (1+\lambda)(kN - C_l)$$

For sufficiently large  $N$ , this condition is equivalent to

$$\frac{1}{2}C_h > k(1+\lambda)$$

Note that a majority of  $pN + 1$  individuals support the proposal of the agenda setter in this case, while all project losers except the agenda setter reject it. However, no agent has an incentive to switch. A taxed project winner would make the proposal unconstitutional by voting no because of CTW, which makes him worse off. The agenda setter also benefits from voting yes.

(C) Expected net transfers (taxes minus subsidies) at the constitutional stage are given by:

$$\begin{aligned} & \left\{ \frac{N-1}{2N}C_h - \frac{1}{N} \left\{ \frac{(N-1)C_h}{2(1+\lambda)} - kN \right\} \right\} \\ & = k + \frac{\lambda(N-1)C_h}{2N(1+\lambda)} \end{aligned}$$

Hence, expected utility for individuals at the constitutional stage is given by

$$EU = C - k - \frac{\lambda(N-1)C_h}{2N(1+\lambda)}$$

■

**Proof of proposition 5:**

The proof is derived from considerations similar to the proof of proposition 2. A loser can tax all project winners because of CTW. Since  $e > C_h$  he can receive tax

revenues  $Np \cdot C_h$  that exceed  $Nk(1 + \lambda)$  by at least  $N(1 - p)C_l$  because  $C > k(1 + \lambda)$ . Those revenues  $N(1 - p)|C_l|$  can be channeled to the agenda setter. Therefore he gains subsidies  $\frac{N(1-p)|C_l|}{1+\lambda}$  from  $g = 1$  which is positive and larger than  $|C_l|$  if  $p < 1$  as assumed and  $N$  sufficiently large. All project winners vote yes, while project losers reject the proposal. The proposal will be adopted. It is impossible to propose any tax/subsidy schedule and  $g = 0$  that would be adopted by a  $p$  - majority.

Finally, no individual has an incentive to vote strategically and to make proposals unconstitutional. Project winners do not loose from  $g = 1$  and have no incentive to vote  $g = 0$ . Project losers have no possibility to make proposals unconstitutional since CTW does not require that taxes of majority winners are strictly positive and thus a yes-vote by a project loser is not unconstitutional. ■

**Proof of proposition 6:**

Suppose the agenda setter is a project winner. He can propose

$$g = 1 \tag{A1}$$

$$t = \begin{cases} C_h & \text{for other project winners} \\ 0 & \text{for remaining individuals} \end{cases} \tag{A2}$$

$$s = \begin{cases} -C_l & \text{for } (\frac{1}{2} - p)N \text{ project losers} \\ s_{ag} & \text{for agenda setter} \\ 0 & \text{for others} \end{cases} \tag{A3}$$

The agenda setter can channel the remaining subsidies to himself. Hence,

$$s_{ag} = (pN - 1)C_h(1 + \lambda)^{-1} + (\frac{1}{2} - p)N C_l - kN$$

Then, such a proposal will be supported by other project winners and  $(\frac{1}{2} - p)N$  losers. Obviously, the agenda setter himself will support the proposal because he is a project winner and does not need to pay any taxes.

Suppose the agenda setter is a loser. As we will see the best proposal is

$$g = 1 \tag{A4}$$

$$t = \begin{cases} C_h & \text{for all project winners} \\ 0 & \text{for others} \end{cases} \tag{A5}$$

$$s = \begin{cases} -C_l & \text{for } (\frac{1}{2} - p)N \text{ project losers} \\ s_{ag} & \text{for the agenda setter} \\ 0 & \text{for others} \end{cases} \tag{A6}$$

The proposal would be supported by all project winners and  $(\frac{1}{2} - p)N$  project losers and hence a majority. The agenda setter is better off if and only if  $s_{ag} \geq -C_l$ .  $s_{ag} \geq -C_l$  is feasible if and only if

$$pN C_h(1 + \lambda)^{-1} + (\frac{1}{2} - p)NC_l - Nk \geq -C_l$$

which for sufficiently large  $N$  implies

$$p C_h \geq k(1 + \lambda) - (\frac{1}{2} - p)C_l(1 + \lambda),$$

which, in turn, is equivalent to our assumption. ■

### Proof of proposition 8:

Since it is socially undesirable to provide the public good, the constitutional rules should lead project winners and losers to propose  $g = 0$  and no taxes and subsidies. Because of *ETT* and *ETS*, no agent will ever propose taxes in order to generate subsidies since net-transfer  $\tau_j = \tau = \frac{t}{(1+\lambda)} - t < 0$  for every positive tax rate  $t$ .

Suppose that the agenda setter is a winner. If he wants to finance the project, he must propose a tax rate  $t = k(1 + \lambda)$ . However, to form a majority in favor of the project he must obtain a vote from a project loser, since a majority requires at least  $pN + 1$  votes because we have a  $\max\{\frac{pN+1}{pN}, \frac{1}{2}\}$ -majority rule. But a project loser will never vote for a proposal that will lead to  $g = 1$ . Obviously, a project loser will never propose  $g = 1$ . Hence, the constitution implements a first-best allocation. ■



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