

Chapter 2

Retrospect – Competition of Politicians for Incentive Contracts

2.1 Background

This chapter provided the groundwork for our research on Contractual Democracy. We started in the 1990s, when we were working on deficiencies of democracy and trying to find ways to overcome them. Soon, first inventions emerged, which started with Gersbach (2003) and with this chapter.

We started by focusing on the difficulty to motivate office-holders to undertake socially desirable long-term projects. Long-term issues such as unemployment problems appear to be difficult for politicians to solve in a limited period of time.

The fact that an office is held for a given period only, as typical for democratic systems, is essential. Without this limitation, the system would not be democratic. However, the shorter the term, the more challenging the fact that the implementation of many projects takes longer than one term. Thus, an office-holder might not have the opportunity to complete long-term projects, although they might be beneficial to society. At the end of his first term, the office-holder could try to be reelected to pursue his long-term projects in his second term. But to earn the votes required for reelection, he needs short-term results—a seemingly inextricable situation.

Our goal was to suggest a way to mitigate this drawback without endangering the basic structure of democracy. We developed a hierarchical structure of incentive contracts and elections and examined the consequences of allowing politicians to compete with them. The contracts stipulate that the office-holder's utility or income in his second office period will depend on a given, verifiable long-term achievement or result. Typically, this corresponds to a long-term project initiated during the first term in office, which yields results during the second term. If they wish, the candidates

can offer such contracts before the *first election*, although the contracts concern the *second period in office*, and only come into force if an office-holder is reelected.¹

2.2 Introduction

In a simple model, we examine how competition between politicians for incentive contracts and elections can motivate them to undertake socially desirable long-term projects, while preserving the democratic legitimization of politicians.

Two candidates compete for office in an initial election period and for subsequent reelection. Candidates are motivated by the offices they hold and by the policies they undertake. Once a candidate is elected he can undertake socially desirable long-term projects, opt for inefficient short-term projects or stick to the status quo. Returns from long-term projects only accrue to voters in a second election period. The problem for the public is that the politicians might discount the future more than citizens do, and/or reelection prospects are uncertain and only loosely connected to policy results. In such cases, politicians behave short-term oriented and the public cannot sufficiently motivate a politician to invest in long-term projects. This holds even if the public could commit itself to reelection.

To alleviate these inefficiencies we suggest the electorate to use a hierarchy of incentive contracts and elections. Candidates are given the possibility of offering incentive contracts when campaigning for office for the first election period. The incentive contract stipulates that in the event of reelection the politician's utility or income in the second election period depends on policy returns such as the level of unemployment. Incentive contracts become binding as soon as the politician decides to stand for reelection and is actually reelected. Candidates are free to offer empty contracts or contracts making their income depend on long-term returns.

Our findings are as follows: First, if the politician's discount factor is below a certain threshold, the public cannot motivate him to undertake long-term projects by election alone. This also holds if the public commits itself to a reelection scheme. If reelection prospects are sufficiently uncertain, politicians may not be motivated to undertake long-term policies even if they do not discount the future at all.

Second, when politicians can offer incentive contracts and the public commits itself to a reelection scheme, the result is a unique equilibrium. Both politicians offer the same contract. The equilibrium contract stipulates future transfers ensuring that the politician with the lower discount factor will be indifferent about choosing the long-term project or the short-term project. Transfers are interpreted in a wide sense. For instance, a politician may receive special monetary remunerations in the future or

¹This chapter was first published as a paper in *Public Choice* and included as a short version as Chap. 3 in *Designing Democracy* under the title 'Short-termism and competition for incentive contracts' (Gersbach 2004, 2005). In the present edition, we include the original paper, with minor amendments.

he may become a special honorary citizen if his policies generate long-term benefits for society. The politician with the larger discount factor is elected; his prospects of reelection are sure-fire and he will take the socially efficient long-term decision.

In the following, we relax two of the assumptions upon which the previous findings have built. Our third result shows that the hierarchy of elections and incentive contracts will still induce politicians to undertake socially beneficial long-term projects, even if the public cannot commit itself to any future reelection behavior. We consider two reasons why current voters may not be able to commit themselves to a certain future voting behavior: The democratic requirement for unconstrained voting in every election and incentives to reject the incumbent in order to economize on his future remunerations.² In the first case, future transfers to an elected politician undertaking the long-term project must be higher in equilibrium. In the second case, incentive contracts must include a golden parachute clause guaranteeing a future bonus to a politician, even when he is no longer in office.

In our fourth result we allow for the case where the public does not know the discount factors of politicians competing for office. In the corresponding game between politicians and the public under asymmetric information, there exists a Bayesian Nash equilibrium in which all types of politicians will undertake beneficial long-term projects. Under uncertainty about the politician's discount factor, the public will have to grant benefits to the politician corresponding to the benefits under certainty with the lowest possible realization of the discount factor.

To sum up, competition among politicians for the hierarchy of incentive contracts and elections, appears to be a reasonably robust mechanism to overcome short-termism. Since the contracts suggested in this chapter have no counterpart in reality there are a number of practical issues regarding the application of the hierarchy of incentive contracts and elections, which we will address in the final section.

This chapter is related to the literature about electoral accountability which was initiated by Barro (1973), Ferejohn (1986) and recently extended by Persson et al. (1997) (see Persson and Tabellini 2000 for a survey). Politicians and voters are assumed to have divergent interests, and elections are means by which voters control politician misbehavior, since the possibility of reelection induces self-interested politicians to act on behalf of the interests of the electorate. In this chapter, we introduce competition of politicians for incentive contracts and elections as a novel element in politics. We combine contractual and electoral accountability while at the same time preserving the democratic legitimization of politicians.

Incentive elements in politics other than elections have been discussed in Gersbach (2003). He examines how the public can make the value of holding office in a second term dependent on the realization of macroeconomic variables, such that the incentive for politicians increases to undertake socially desirable policies with long-term consequences in the first term. In this chapter, we introduce competition

²The second reason is less important since the remuneration of a politician creates only a negligible burden per capita for the public.

of politicians for incentive contracts and elections in democracies with periodic, free and anonymous elections.³

For simplicity, we consider a political economy model where politicians and voters differ with respect to their relative valuation of future and current utilities. This is a tractable model for the analysis of how competition for incentive contracts and elections may alleviate inefficiencies in democracies. In practice, as is discussed in the concluding section, democracies may produce inefficiencies for a wide variety of reasons and it is not clear whether the source of inefficiency we are focusing on is the most important one. However, the ideas presented in this chapter may be useful when applied to other kinds of inefficiencies in political processes.

The chapter is organized as follows: In the next section, we outline the model and our assumptions. In Sect. 2.4, we consider the potentialities and limitations of the election mechanism for achieving optimal decisions. In Sect. 2.5, we show that competition among politicians for incentive contracts and election induces socially optimal decisions. In Sect. 2.6, we extend our analysis to the non-commitment case. In Sect. 2.7, we discuss asymmetric information. Section 2.8 presents our conclusions.

2.3 Model and Assumptions

The game we are analyzing is a dynamic game with two periods. We assume that the politician (or agent) is risk-neutral, and “the public” represents the voters. Returns from projects are denoted by V . V^1 and V^2 are the returns in period 1 and period 2, respectively. Specific realizations will be indexed according to the type of project and the period involved. The game is given as follows:

- Stage 1: At the beginning of period 1 two politicians, denoted by $i = 1, 2$, simultaneously offer incentive contracts $C_1(\beta_1 V^2)$ and $C_2(\beta_2 V^2)$ with the following interpretation: if politician i gets reelected in period 2, he receives a net transfer $\beta_i V^2$ if $V^2 > 0$ and has to pay $|\beta_i V^2|$ if $V^2 < 0$, where $\beta_i \in [0, 1]$.⁴
- Stage 2: The public decides whether the politician gets elected. We use $p_i \in [0, 1]$ to denote the probability that politician i will be elected, so that $p_1 + p_2 = 1$.
- Stage 3: The elected agent must decide whether to undertake certain projects. He has three options. He can undertake a short-term policy (*STP*) generating a positive return $V_s^1 > 0$ in this period, but a negative return $V_s^2 < 0$ next period. The second option is a long-term policy (*LTP*). For simplicity

³While there is no further literature on competition for incentive contracts by politicians, there is a rapidly growing literature on incentive contracts for central bankers where democratic requirements play no role initiated by Walsh (1995a, b) and developed by Persson and Tabellini (1993), Lockwood (1997), Svensson (1997) and Jensen (1997).

⁴These payments affect the utility of the voters accordingly.

of presentation the long-term policy is assumed to have no short-term consequences, i.e. $V_L^1 = 0$, but *LTP* does generate positive payoffs $V_L^2 > 0$ in the next period. The last option for the policy-maker is to continue the status quo and to do nothing (*NOT*). Payoffs in this case are $V_N^1 = 0$ and $V_N^2 = 0$, respectively, in the two periods.

To sum up, the elected politician decides among his options in $\{STP, LTP, NOT\}$.

Stage 4: The returns from the first period are made public. The elected politician decides whether he wants to run for office again. The public decides on the reelection of the politician. The probability that politician i is reelected is denoted by $q_i \in [0, 1]$.

All costs and benefits are measured in dollars. The social returns from the status quo have been normalized to zero. There are many examples of *LTP* projects versus *STP* or *NOT* projects. For instance, labor market reforms or transition processes of centrally planned market economies towards market economies may imply no welfare improvements in the short-term,⁵ but may generate benefits in the long term. Other examples are political business cycles where politicians adopt short-term policies instead of long-term policies before elections, thus leading to upturns before and downturns after elections,⁶ or investments in infrastructure requiring a temporary cut-down on consumption but producing positive returns at a later stage.

We assume that contracts can be conditioned on social returns measured for instance by GDP growth or criminal statistics.⁷ However, we assume that contracts cannot be conditioned on the policy choice itself. The latter assumption follows the reasoning in the incomplete contract literature (see the survey of Hart 1995). In politics complete contracts would require to write all conceivable laws into contracts before they are initiated in Parliament, which appears to be impossible.

We assume that a politician can generate private returns if he realizes social returns larger than the returns of the status quo and as long as he is in power. The social returns from the status quo have been normalized to zero. If politician i is in power and realizes a social project return V^1 in period 1 or V^2 in period 2, we assume that his private benefits are:

$$R_i^1 = \alpha V^1 \text{ or } R_i^2 = \alpha V^2, \quad (2.1)$$

respectively, where α is some number, with $0 < \alpha < 1$. The above assumption is justified by the observation that high returns enable the agent to channel some returns to interest groups that support him, as is suggested by the large literature in public

⁵In some cases, short term consequences of *LTP* can even be negative, but this can easily be integrated into our framework.

⁶The literature on political business cycles started with Nordhaus (1975), Ben-Porath (1975) and was expanded to ideological business cycles by Hibbs (1977). In Rogoff (1990), Cuckierman and Meltzer (1986), Hibbs (1992) and Persson and Tabellini (1993), the theory has been adapted to incorporate rational expectations and information asymmetries.

⁷For simplicity of exposition contracts are assumed to be linear in social returns. Since returns in the second period can only take three values, this assumption could easily be relaxed.

choice (see e.g. Mueller 1989).⁸ Alternatively, the politician is genuinely concerned about the social returns he generates as long as the outcomes of policies occur while he is in office. We follow the latter interpretation, which simplifies the analysis.⁹

We concentrate on the agent's expected utility in period 1, when politicians stand for election for the first time. We assume that the utility of politician i increases both in the private benefits from holding office, given by $B > 0$, and from the private benefits of investment projects. In particular, we assume that the expected utility of agent i is given by

$$U_i = p_i \left[(1 - m)B + mR_i^1 + \delta_i q_i \left((1 - m)B + m(R_i^2 + \beta V^2) \right) \right],$$

where $R_i^1 = \alpha V^1$ and $R_i^2 = \alpha V^2$ are the private returns in period 1 and 2, respectively. The $\delta_i \in [0, 1]$ denotes the discount factor of politician $i \in \{1, 2\}$, and reflects the impatience of the politician. The parameter m , with $0 < m < 1$, is the significance the agent assigns to private returns from projects and $1 - m$ is the significance of benefits from holding office. The parameter m is assumed to be the same for both politicians. A significance m close to 1 means that the agent is mainly motivated by the policies he implements. A low value for m corresponds to an agent being mainly concerned to hold office. The utility of outside options is normalized to zero. Throughout the chapter, we assume that $(1 - m)B$ is sufficiently large, to ensure that net utilities of politicians in the second period are always non-negative.

To simplify the exposition we use¹⁰

- $U_i^L(\beta_i, RE)$ to denote the utility of an elected politician i if he has offered the contract $C_i(\beta_i V^2)$, undertakes *LTP* and is reelected:

$$U_i^L(\beta_i, RE) = (1 - m)B + \delta_i \left\{ (1 - m)B + mV_L^2(\alpha + \beta_i) \right\} \quad (2.2)$$

- $U_i^S(\beta_i, RE)$ to denote the utility of an elected politician i if he has offered $C_i(\beta_i V^2)$, undertakes *STP* and is reelected:

$$U_i^S(\beta_i, RE) = (1 - m)B + m\alpha V_S^1 + \delta_i \left\{ (1 - m)B + mV_S^2(\alpha + \beta_i) \right\} \quad (2.3)$$

- $U_i^S(\beta_i, NRE)$ to denote the utility of an elected politician i if he has offered $C_i(\beta_i V^2)$, undertakes *STP* and does not stand for reelection:

$$U_i^S(\beta_i, NRE) = (1 - m)B + m\alpha V_S^1 \quad (2.4)$$

⁸An alternative assumption about private returns developed by Coate and Morris (1995) would be $R_i = \max[\alpha V, 0]$. This assumption would strengthen the need to use incentive contracts because *STP* becomes more attractive.

⁹The first interpretation yields the same qualitative conclusions, but the public needs to take into account that some returns from projects are channeled to the politician or the interest group supporting him.

¹⁰We can neglect the case where the office-holder selects *LTP* and is deselected, because in such cases, he is always better off choosing *STP*.

We allow for the fact that politicians may differ in their discount factor $\delta_i \in [0, 1]$, $i = 1, 2$. In many cases such differences are known to the public. Consider for example the election race between the incumbent, Kohl, and the challenger, Schröder, in 1998 in Germany. It was well known that Kohl was competing for a final term whereas Schröder wanted to start his era as chancellor. Therefore, we assume in the following that δ_1 and δ_2 are known to the public and we label candidates such that $\delta_1 \leq \delta_2$. Later we will relax the informational assumptions about discount factors.¹¹

We denote the returns to the public from the options *STP*, *LTP* and *NOT* over the lifetime of the project, by EV_S , EV_L , and EV_N , respectively.¹² Thus, we have

$$\begin{aligned} EV_S &= V_S^1 + \bar{\delta} V_S^2, \\ EV_L &= \bar{\delta} V_L^2, \text{ and} \\ EV_N &= V_N^1 + \bar{\delta} V_N^2 = 0, \end{aligned}$$

where $\bar{\delta}$ is the discount factor of the public ($0 < \bar{\delta} \leq 1$). The social discount factor may be higher or lower than that of the politicians. Note that $EV_L > EV_N$. We further assume that

$$\begin{aligned} V_S^1 &> EV_L > 0, \\ 0 &= EV_N > EV_S. \end{aligned}$$

The preceding assumption immediately implies that in social terms the optimal policy is *LTP*. To simplify the presentation, we employ three tie-breaking rules. First, if two politicians generate the same social welfare, the public will elect the politician with the higher discount factor. Second, if both politicians are equally good in terms of social welfare and are identical in terms of the discount factor, both politicians have the same chance $p_1 = p_2 = \frac{1}{2}$ of being elected. Third, if a politician is indifferent as to two types of policies, he will select the one that yields higher social welfare. These tie-breaking rules simplify the exposition but are not essential for the results.

2.4 Elections

In this section we discuss how the public can motivate politicians to undertake *LTP* if the only instrument available is the election mechanism. We assume that the public can commit itself in stage 1 to its reelection scheme for stage 4, with the two reelection probabilities $q(V_S^1)$ respectively $q(0)$. The first applies when *STP* is chosen and the

¹¹Our main results can easily be extended to more than two politicians and to discount factors picked from a continuous set. For instance, in the case of three or more politicians only those two politicians with the highest discount factors matter for the Propositions 2.3, 2.4 and 2.5 and the corresponding corollaries.

¹²These returns may be further affected by transfers between the public and the office-holder.

second applies when *LTP* or *NOT* are chosen. This gives the best chance of elections inducing elected politicians to choose *LTP*. However, no incentive contracts can be offered. We obtain:

Proposition 2.1 *Suppose the public can commit to a reelection scheme and that $\delta_i \leq \delta(m)$, with*

$$\delta(m) = \frac{m\alpha V_S^1}{(1-m)B + m\alpha V_L^2}. \quad (2.5)$$

*Then, the politicians cannot be motivated by elections to adopt *LTP*.*

Proof of Proposition 2.1

It is obvious that the politician will never choose *NOT* under any reelection scheme, because he benefits equally or more from *LTP* or *STP*. Additionally, it is obvious that the optimal reelection scheme for voters is $q(0) = 1$ and $q(V_S^1) = 0$, which is the maximum spread to deter the politician from choosing *STP*. The critical discount factor is then determined by setting $U_i^L(0, RE) = U_i^S(0, NRE)$, which yields:

$$\delta(m) = \frac{m\alpha V_S^1}{(1-m)B + m\alpha V_L^2}.$$

If $\delta(m) < 1$, a politician with $\delta_i \in (\delta(m), 1]$, will choose *LTP* under the reelection scheme $q(0) = 1$ and $q(V_S^1) = 0$, and *STP* otherwise. \square

From here, we immediately obtain $\delta(0) = 0$ and

$$\frac{\partial \delta(m)}{\partial m} = \frac{\alpha V_S^1 B}{\{(1-m)B + m\alpha V_L^2\}^2} > 0. \quad (2.6)$$

Therefore, since $m > 0$, we have a range for the discount factor at which politicians will not choose the socially efficient policy. Note that voters are assumed to be fully rational and infer negative future returns from the positive returns of short-term projects in the first election period.

The underinvestment problem becomes more pronounced when the public cannot commit to a reelection scheme, which is the natural assumption for democratic decision-making. As an example for the severity of the underinvestment problem in such cases, suppose that the public votes prospectively and that past policy performance does not influence reelection chances.¹³ In particular, suppose that $q(0) = q(V_S^1) = \frac{1}{2}$ and thus, from the perspective of the beginning of the first term the incumbent is reelected with probability $\frac{1}{2}$ and thus independently of the adopted policy. Then we obtain:

Proposition 2.2 *Suppose that the public cannot commit to a reelection scheme. Furthermore, suppose $q(0) = q(V_S^1) = \frac{1}{2}$ and that $\delta_i \leq \hat{\delta}(m)$, with*

¹³This is an extreme assumption and solely made for expositional purposes.

$$\hat{\delta}(m) = \max \left\{ \frac{2m \alpha V_S^1}{(1-m)B + m \alpha V_L^2}, \frac{2V_S^1}{V_L^2 - V_S^2} \right\}.$$

Then the politician cannot be motivated by elections to undertake *LTP*.

Proof of Proposition 2.2

The proof is similar to the proof of Proposition 2.1. The utilities are now calculated using the reelection probability $\frac{1}{2}$. Moreover, the politician has a chance to be reelected if he selects *STP*. The corresponding comparisons yield:

$$\delta_i = \frac{2V_S^1}{V_L^2 - V_S^2} \quad \text{and}$$

$$\delta_i = \frac{2m \alpha V_S^1}{(1-m)B + m \alpha V_L^2},$$

which establishes the proposition. \square

The preceding proposition illustrates that the underinvestment problem is severe if reelection prospects are not (or only loosely) connected with policies undertaken in the past. In such cases, as the following corollary illustrates, there are circumstances when no politician invests in *LTP*, independent of his discount factor.

Corollary 2.1 *Suppose that the public cannot commit to a reelection scheme. Suppose that $q(0) = q(V_S^1) = \frac{1}{2}$ and $V_S^1 + \frac{1}{2}V_S^2 > \frac{1}{2}V_L^2$. Then, no politician can be motivated by elections to adopt *LTP*.*

The corollary immediately follows from Proposition 2.2. Under $V_S^1 + \frac{1}{2}V_S^2 > \frac{1}{2}V_L^2$, the critical discount factor becomes larger than 1 and thus politicians will choose *STP*, no matter how large their discount factors are. Intuitively, if the short-term project is not too bad, the low probability of reelection induces politicians to adopt the *STP*, since they can benefit with certainty from returns in the first term and they have no influence on their reelection chances. Note that the weight m on policy in the objective function of the politician is irrelevant in Corollary 2.1 since the politician expects the same private benefits from holding office under *LTP* and *STP*. In the next section we begin to address how incentive contracts can overcome the inefficiencies identified in this section.

2.5 Competition for the Incentive Contracts

In this section we consider the whole game and allow politicians to offer incentive contracts before the first election takes place. We assume that voters can commit themselves to a reelection scheme in stage 1, so that we can compare the competition for incentive contracts and elections with the previous section. We obtain:

Proposition 2.3 *Suppose $\delta_1 < \delta_2 \leq \delta(m)$. Then there exists a unique subgame perfect equilibrium*

$$\{C_1(\beta_1 V^2), C_2(\beta_2 V^2), p_1 = 0, p_2 = 1, q_1(0) = 1, q_2(0) = 1, q_1(V_S^1) = 0, q_2(V_S^1) = 0\},$$

with

$$\beta_1 = \beta_2 = \bar{\beta} = \frac{m\alpha V_S^1 - \delta_1 \{(1-m)B + m\alpha V_L^2\}}{m\delta_1 V_L^2}, \quad (2.7)$$

if

$$\bar{\delta} \cdot \bar{\beta} V_L^2 < EV_L - EV_S. \quad (2.8)$$

The proof is given in the Appendix. Proposition 2.3 shows that the hierarchy of elections and incentive contracts eliminates inefficient decision-making in politics at the cost of future transfers to the elected politician. Both politicians offer the same contract. The equilibrium contract stipulates future transfers ensuring that the politician with the lower discount factor will be indifferent about choosing the long-term project or the short-term project. The politician with the larger discount factor is elected; his prospects of reelection are certain and he will take the socially efficient long-term decision. Note that if one discount factor is higher than $\delta(m)$, the transfer may be zero.

In the following, we relax the assumptions upon which the previous result has built. In Proposition 2.3 voters were assumed to commit themselves to a state-dependent reelection scheme. But, competition for incentive contracts and election can still work if the public can only commit itself to a fixed reelection probability, as is illustrated in the following corollary:

Corollary 2.2 *Suppose the public could only commit itself to a fixed reelection probability. Then the subgame perfect equilibrium denoted in Proposition 2.3, with $\bar{\beta}$ as in (2.7), still holds correspondingly with $q_1 = q_2 = 1$, if*

$$(1-m)B + mV_S^2(\alpha + \bar{\beta}) < 0. \quad (2.9)$$

The proof is analogous to the proof of Proposition 2.3, because Condition (2.9) directly implies $U_i^S(NRE) > U_i^S(\bar{\beta}, RE)$, and therefore, with incentive contracts $C(\bar{\beta}V^2)$, neither politician has an incentive to adopt STP and to stand for reelection. To examine the case of non-commitment in the next section, we denote the equilibrium value for $\bar{\beta}$ in the commitment case by $\bar{\beta}^C$. Note that $\bar{\beta}^C$ in Eq. (2.7) depends negatively on δ_1 . A large δ_1 decreases the costs of transfers to the politician and harms the elected politician 2. With the appropriate modifications in the proof, Proposition 2.3 can be extended to the case where politicians are identical:

Corollary 2.3 *Suppose $\delta_1 = \delta_2 \leq \delta(m)$. Then there exists a unique subgame perfect equilibrium*

$$\left\{ C_1(\beta_1 V^2), C_2(\beta_2 V^2), p_1 = \frac{1}{2}, p_2 = \frac{1}{2}, q_1(0) = 1, q_2(0) = 1, q_1(V_S^1) = 0, q_2(V_S^1) = 0 \right\},$$

with

$$\beta_1 = \beta_2 = \bar{\beta}^C = \frac{m\alpha V_S^1 - \delta_1 \{(1-m)B + m\alpha V_L^2\}}{m\delta_1 V_L^2}, \quad (2.10)$$

if

$$\bar{\delta} \bar{\beta}^C V_L^2 < EV_L - EV_S. \quad (2.11)$$

2.6 Competition Without Commitment

The assumption that voters can commit themselves to a reelection scheme has mainly been made in order to give the election mechanism the best chance to motivate political leaders to invest in long-term, efficient projects. However, from a strictly democratic point of view, voters are unable to commit future citizens to adhere to a particular voting behavior. The contracting problem is rooted in the uncertainty about future electoral interests and the liberal principle of democracies to allow for free and anonymous voting behavior in elections.

The impossibility of commitment to future voting behavior represents another source of inefficiency outlined in Glazer (1989), Gersbach (1993), Besley and Coate (1998) and in related work by Alesina and Tabellini (1990) and Persson and Svensson (1989). We can integrate the impossibility of commitment into our model. There are two non-commitment problems: Incentives of voters to reject an incumbent so as to economize on his future remunerations, and the democratic requirement for unconstrained voting in every election. We deal with the latter case first. Suppose there is complete uncertainty about the voting behavior of future generations, so that an elected politician today has an a priori probability of reelection of $q_i = \frac{1}{2}$ independent of his actions in the past.¹⁴ This is an opposite pole to the commitment case where q_i is 1 if the choice of *LTP* is expected and 0 otherwise. Though we think that intermediate cases are the most plausible, it is instructive to compare these polar opposites. For the non-commitment case we obtain:

Proposition 2.4 *Suppose $\delta_1 \leq \delta_2 \leq \delta(m)$. Then there exists a unique subgame perfect equilibrium*

$$\left\{ C_1(\beta_1 V^2), C_2(\beta_2 V^2), p_1 = 0, p_2 = 1, q_1(0) = \frac{1}{2}, q_2(0) = \frac{1}{2}, q_1(V_S^1) = \frac{1}{2}, q_2(V_S^1) = \frac{1}{2} \right\},$$

with

¹⁴This is equivalent to the notion of unconstrained voting in the context of retrospective voting (Ferejohn 1986).

$$\beta_1 = \beta_2 = \bar{\beta}^{NC} = \max \left\{ \frac{2m\alpha V_S^1 - \delta_1 \{(1-m)B + m\alpha V_L^2\}}{m\delta_1 V_L^2}, \frac{2\alpha V_S^1 - \delta_1 \alpha (V_L^2 - V_S^2)}{\delta_1 (V_L^2 - V_S^2)} \right\}, \quad (2.12)$$

if¹⁵

$$\bar{\delta} \bar{\beta}^{NC} V_L^2 < EV_L - EV_S. \quad (2.13)$$

The proof is similar to the commitment case. But now we have to compare $U_i^L(\bar{\beta}, RE)$ with $U_i^S(\bar{\beta}, RE)$ and $U_i^S(NRE)$, and the utility in the second period must be evaluated with $q_1 = q_2 = \frac{1}{2}$ instead of certain reelection. An immediate consequence is:

Corollary 2.4 *In the equilibrium above, it holds that*

$$\bar{\beta}^{NC} > \bar{\beta}^C. \quad (2.14)$$

It is obvious that under non-commitment it requires a higher future transfer to make the politician with the lower discount factor indifferent as to *LTP* and *STP*. The impossibility of the present generation of voters to commit future voters to a particular election choice entails the larger transfer a reelected politician must receive if he undertakes *LTP*.

There might be a second and even more extreme case of non-commitment if voters at the reelection date definitely reject the incumbent, in order to economize on future remunerations for the politician. In this case the nature of the incentive contracts can be amended in the following way. The incentive contract becomes effective when the politician stands for reelection, independently of whether he is reelected. Thus, he can receive future benefits from *LTP*, even if he is not in office anymore. We call such incentive contracts golden parachute contracts; they are denoted by C_1^{Pa} and C_2^{Pa} , respectively. The expected utility for a politician i who has offered $C_i^{Pa}(\beta_i V^2)$ and is not reelected is denoted by $U_i^{Pa}(\beta_i, NRE)$ and given by

$$U_i^{Pa}(\beta_i, NRE) = p_i \{(1-m)B + m(R_i^1 + \delta_i \beta_i V^2)\}, \quad (2.15)$$

where R_i^1 is either αV_S^1 or 0. We immediately obtain:

Proposition 2.5 *Suppose that $\delta_1 < \delta_2 < \delta(m)$ and politicians can offer golden parachute contracts and the politician elected in period 1 is never reelected. There then exists a unique subgame perfect equilibrium in which politicians offer golden parachute contracts, given by*

$$\{C_1^{Pa}(\beta_1 V^2), C_2^{Pa}(\beta_2 V^2), p_1 = 0, p_2 = 1\}, \quad (2.16)$$

¹⁵Condition (2.13) is sufficient but since politicians selecting *STP* have a chance to be reelected the proposition also holds on weaker conditions.

with

$$\beta_1 = \beta_2 = \bar{\beta}^{NCPa} = \frac{\alpha V_S^1}{\delta_1 V_L^2}, \quad (2.17)$$

if

$$\bar{\delta} \cdot \bar{\beta}^{NCPa} V_L^2 < EV_L - EV_S. \quad (2.18)$$

The proof is analogous to the previous proposition. Note that $\bar{\beta}^{NCPa}$ is determined by setting $U_1^{Pa,L}(\bar{\beta}^{NCPa}, NRE) = U_1^S(NRE)$ because a politician is not forced to offer a parachute contract. The left-hand side is the utility when the politician chooses *LTP*. Note also that we apply the tie-breaking rule that candidate 2 is elected if the public is indifferent between the two candidates. While we have assumed an extreme case of non-commitment in Proposition 2.5, it is obvious that the option to offer golden parachute contracts also works for intermediate values of positive reelection probabilities when standard contracts cannot induce *LTP* with lower costs for the public.

2.7 Asymmetric Information

While politicians' discount factors may be well known in some circumstances, there may be more uncertainty in other cases. For instance, when two politicians are competing for office for the first time, the public may be uncertain about the preferences of the politicians and in particular about their discount factors. To explore how asymmetric information affects the functioning of the dual mechanism - incentive contracts and elections - we assume that the public knows that both politicians competing for office have discount factors δ^H with probability w and $\delta^L < \delta^H$ with probability $1 - w$. We assume that politicians know the discount factor of their opponent.¹⁶ We further use b_i ($i = 1, 2$) to denote the beliefs of the public that politician i has discount factor δ^H after incentive contracts $C_1(\beta_1 V^2)$ and $C_2(\beta_2 V^2)$ have been offered. Then we look for perfect Bayesian equilibria of the election and the incentive contract game. We consider the case where the public can commit to a reelection scheme and obtain:

Proposition 2.6 *There exists a perfect Bayesian Nash equilibrium¹⁷*

$$\{C_1(\beta_1^* V^2), C_2(\beta_2^* V^2), p_1^*, p_2^*, q_1^*(0), q_2^*(0), q_1^*(V_S^1), q_2^*(V_S^1), b_1^*, b_2^*\},$$

¹⁶The assumption appears to be plausible because of the superior knowledge politicians have about each other through their daily interaction.

¹⁷Other equilibria exist. For instance, lower values of $\bar{\beta}^{AI}$ can be supported as equilibria as well. Moreover, one can apply refinements to the Bayesian equilibrium notion to support particular values of β_1 and β_2 in equilibrium. Details are available upon request.

if

$$\bar{\delta} \cdot \bar{\beta}^{AI} V_L^2 < EV_L - EV_S, \quad (2.19)$$

where

(i)

$$\beta_1^* = \beta_2^* = \bar{\beta}^{AI} = \frac{m\alpha V_S^1 - \delta_L \{(1-m)B + m\alpha V_L^2\}}{m\delta_L V_L^2}. \quad (2.20)$$

(ii) An elected politician chooses LTP in equilibrium.

(iii)

$$b_1^*(\beta_1, \beta_2) = \begin{cases} w & \text{if } \beta_1 = \bar{\beta}^{AI} \\ 0 & \text{otherwise;} \end{cases} \quad (2.21)$$

$$b_2^*(\beta_1, \beta_2) = \begin{cases} w & \text{if } \beta_2 = \bar{\beta}^{AI} \\ 0 & \text{otherwise.} \end{cases} \quad (2.22)$$

(iv)

$$p_1^*(\beta_1, \beta_2) = \begin{cases} \frac{1}{2} & \text{if } \beta_1 = \beta_2 \\ \frac{1}{2} & \text{if } \bar{\beta}^{AI} > \beta_1 > \beta_2 \text{ or } \bar{\beta}^{AI} > \beta_2 > \beta_1 \\ 1 & \text{if } \beta_1 = \bar{\beta}^{AI} \text{ and } \beta_2 \neq \bar{\beta}^{AI} \\ 1 & \text{if } \beta_1 > \bar{\beta}^{AI} > \beta_2 \text{ or } \bar{\beta}^{AI} < \beta_1 < \beta_2 \\ 0 & \text{otherwise;} \end{cases} \quad (2.23)$$

$$p_2^*(\beta_1, \beta_2) = \begin{cases} \frac{1}{2} & \text{if } \beta_1 = \beta_2 \\ \frac{1}{2} & \text{if } \bar{\beta}^{AI} > \beta_1 > \beta_2 \text{ or } \bar{\beta}^{AI} > \beta_2 > \beta_1 \\ 1 & \text{if } \beta_2 = \bar{\beta}^{AI} \text{ and } \beta_1 \neq \bar{\beta}^{AI} \\ 1 & \text{if } \beta_2 > \bar{\beta}^{AI} > \beta_1 \text{ or } \bar{\beta}^{AI} < \beta_2 < \beta_1 \\ 0 & \text{otherwise.} \end{cases} \quad (2.24)$$

(v)

$$\begin{aligned} q_1^*(0) &= q_2^*(0) = 1, \\ q_1^*(V_S^1) &= q_2^*(V_S^1) = 0. \end{aligned} \quad (2.25)$$

The proof of Proposition 2.6 is given in the Appendix. Proposition 2.6 shows that the hierarchy of incentive contracts and elections also works under incomplete information. But, $\bar{\beta}^{AI}$ is evaluated at the lower discount factor. Therefore, the public is forced to accept transfers to the politician, that are higher than the transfers expected when δ was either δ^L or δ^H . The expected transfer in the latter case would amount to

$$w\bar{\beta}^{AI} V_L^2 + (1-w)\bar{\beta}(\delta_H) V_L^2. \quad (2.26)$$

2.8 Discussion and Conclusion

Our simple analysis suggests that the dual mechanism of competition for elections and incentive contracts might alleviate some of the inefficiencies in democratic decision-making. However, there are many issues still waiting to be examined. There are practical issues; for instance regarding which quantitative measures should be used for the incentive contract. This seems fairly obvious in the case of European unemployment, because the incentive contract can be based on the average unemployment rate. But a definition problem remains as the unemployment rate can be defined in many different ways. Hence, there is a need to agree upon a definition that cannot be changed or manipulated once it has been adopted.

Moreover, it is often hard to measure social welfare beyond macroeconomic indicators and politicians usually face multi-task problems. Politicians in the executive and legislative branch are typically concerned with many different issues. Whereas issues such as unemployment or crime can be quantified with sufficient precision, this is not the case for other issues such as reforming health care or the judicial system. Therefore, performance in a significant part of their activities cannot be measured with any real degree of precision. As we know from the theory of multi-task incentive problems, outlined in Holmström and Milgrom (1991), severe measurement constraints can make it impossible to use task-specific performance schemes or aggregate performance measures. For instance, if politicians are only judged by their employment performance, they may simply inflate the public sector to meet the required standard and neglect other important issues.

Nevertheless, the multi-task and the measurement problem might be alleviated by the hierarchical incentive mechanism proposed in this chapter. A politician can only stand for reelection if he is willing to base his future income or the right for future reelection on the performance on one issue, say unemployment. If he accepts the incentive component, he can stand for reelection and voters can judge his performance on the remaining issues. If he has accepted the incentive contract, but only worked to reduce unemployment, voters may not reelect him because he has a bad record on other important issues. Therefore, the hierarchical incentive scheme might cause the politician to choose the socially desirable policy for one dimension without neglecting other issues.¹⁸

The literature has identified a number of further important inefficiencies in the political system (see the surveys and contributions by Bernholz and Breyer 1993, Mueller 1989, Dixit 1998, Drazen 2000, Frey 1983, Hillman 1989, Niskanen 1971, Olson 1965 and 1982, Stiglitz 1989, Persson and Tabellini 2000 and Tollison 1982 as well as the seminal work on constitutional design by Buchanan and Tullock 1962). How the dual mechanism can be applied for these kinds of inefficiencies and for more sophisticated political-economic models, constitutes a complete research program.

While the actual reach of the dual mechanism can only be judged after these avenues have been explored and a number of obvious practical issues have been

¹⁸There are a number of further practical issues, for instance enforcing the incentive contract will require a special court.

addressed, we think that well-designed incentive elements could complement the reelection mechanism in motivating politicians to invest in socially desirable policies.

Appendix

Proof of Proposition 2.3

Condition (2.8) ensures that the public is better off committing itself to reelection and accepting a politician with $C_1(\bar{\beta}V^2)$, who implements *LTP*, than setting $q_1(0) = q_2(0) = 0$, which avoids the transfer $\bar{\beta}V_L^2$ but implies *STP*. The public sets $q_i(V_S^1) = 0$ because they will receive negative returns, when a politician undertakes *STP*. The value of $\bar{\beta}$ is calculated such that the first candidate is indifferent as to *STP* and *LTP* if elected. Hence $\bar{\beta}$ is determined by

$$U_1^L(\bar{\beta}, RE) = U_1^S(NRE), \quad (2.27)$$

which gives Eq. (2.7). Since the incentive contract is irrelevant if a candidate does not want to stand for reelection we have

$$U_1^S(NRE) = U_2^S(NRE). \quad (2.28)$$

Because of $\delta_1 < \delta_2$ we have

$$U_2^L(\bar{\beta}, RE) > U_1^L(\bar{\beta}, RE). \quad (2.29)$$

Candidate 2 has a strict preference for *LTP* if elected, in contrast to the indifference as to *LTP* and *STP* of candidate 1 if elected.

To establish equilibrium, we consider four possible deviations from the equilibrium described in Proposition 2.3.

First, suppose that candidate 2 deviates and offers $C_2(\beta_2 V^2)$ with $\beta_2 > \bar{\beta}$. The deviation is not profitable if candidate 2 is not elected; this, in turn, is only a best response for voters if candidate 1 chooses *LTP* when elected and reelected. This requires that the following inequality holds:

$$U_1^L(\bar{\beta}, RE) \geq U_1^S(NRE). \quad (2.30)$$

By construction $U_1^L(\bar{\beta}, RE) = U_1^S(NRE)$. Thus politician 2 will not be elected although he chooses *LTP* because candidate 1 demands less transfer and chooses *LTP* in accordance with our tie-breaking rule. Thus, deviating is not profitable.

Second, suppose candidate 1 deviates to $C_1(\beta_1 V^2)$ with $\beta_1 < \bar{\beta}$. Such a deviation is only profitable if the public finds it in its best interests to elect and reelect him. Voters want to elect a candidate only if the candidate selects *LTP* once in office. Candidate 1 would choose *LTP* if the following inequalities hold:

$$U_1^L(\beta_1, RE) \geq U_1^S(NRE). \quad (2.31)$$

But $\beta_1 < \bar{\beta}$ implies directly $U_1^L(\beta_1, RE) < U_1^S(NRE)$, so candidate 1 will implement *STP* and the public will elect candidate 2 because he does undertake *LTP*.

Third, suppose candidate 1 deviates to $C_1(\beta_1 V^2)$ with $\beta_1 > \bar{\beta}$. Then the public will not elect politician 1, even if he were to undertake *LTP*, because for voters the payments to the politician are lower when the second candidate is elected. Therefore the deviation is not profitable.

Finally, it is obvious that the second candidate has no incentive to offer a contract $C_2(\beta_2 V^2)$ with $\beta_2 < \bar{\beta}$, because he would receive lower transfers in the second period and in equilibrium can be sure of being elected anyhow.

Uniqueness follows in a similar way. For any offer constellation $C_1(\beta_1 V^2)$, $C_2(\beta_2 V^2)$ with $\beta_i \neq \bar{\beta}$ for at least one candidate, one of the politicians has an incentive to deviate by offering $C_i(\bar{\beta} V^2)$, or by offering an incentive contract that requires slightly fewer transfers from the public.¹⁹ \square

Proof of Proposition 2.6

We first observe that for $\beta_i = \bar{\beta}^{AI}$ both types of politicians choose *LTP*, i.e., independently of whether they have high or low discount factors. Thus, in equilibrium politicians choose *LTP* which validates (ii).

Given the equilibrium and out-of-equilibrium beliefs, $\beta_1^* = \beta_2^* = \bar{\beta}^{AI}$ are best responses for politicians. Given the equilibrium strategy of other politicians, any choice $\beta_i \neq \bar{\beta}^{AI}$ would result in zero probability of election.

Furthermore, we observe that proposed equilibrium beliefs obey Bayes' law. Finally, we have to check the election strategy of voters. Equilibrium election and reelection strategies are optimal since both politicians are identical and will choose *LTP*. According to our assumptions, the public is better off by *LTP* and paying transfers to an elected politician than by inducing *STP*.

Suppose that voters observe a pair (β_1, β_2) which is different from the equilibrium strategies. The following cases can occur:

- $\beta_1 = \beta_2$;
Since the politicians offer the same contract and are ex ante identical, they are elected with probability $\frac{1}{2}$.
- $\bar{\beta}^{AI} > \beta_1 > \beta_2$;
Both politicians if elected would choose *STP*. Since they will not get reelected the public receives no transfers. So both politicians are elected with probability $\frac{1}{2}$.

¹⁹We omit the tedious but easy description of all possible cases.

- $\bar{\beta}^{AI} > \beta_2 > \beta_1$;
Both politicians if elected would choose *STP*. Since they will not get reelected the public receives no transfers. So both politicians are elected with probability $\frac{1}{2}$.
- $\beta_1 = \bar{\beta}^{AI}, \beta_2 < \bar{\beta}^{AI}$;
The first politician chooses *LTP* while the second would select *STP*. According to our assumption the public is better off by electing the first candidate.
- $\beta_1 = \bar{\beta}^{AI}, \beta_2 > \bar{\beta}^{AI}$;
Both politicians select *LTP*. It is cheaper to elect the first politician.
- $\bar{\beta}^{AI} < \beta_1 < \beta_2$;
Both politicians choose *LTP*. The first politician is elected since he requires lower transfers from the public.
- $\beta_1 > \bar{\beta}^{AI} > \beta_2$;
The first politician chooses *LTP*, while the second selects *STP*. The public is better off by *LTP* and paying transfers to an elected politician than by inducing *STP* because a politician who has undertaken *STP* is not reelected and so the public receives no transfers.
- In all other cases, the voters' utility associated with the election of the second candidate is always higher than that of electing the first candidate.

Hence the election and reelection strategies described in (iv) and (v) are indeed optimal. \square

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