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COMPETITION OF POLITICIANS FOR INCENTIVE CONTRACTS AND ELECTIONS

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Abstract

When politicians have lower discount factors than voters, democratic elections cannot sufficiently motivate politicians to undertake long-term socially beneficial projects. When politicians can offer incentive contracts which become effective upon reelection, the hierarchy of contracts and elections can alleviate such inefficient decision-making in politics. This mechanism still works if the public cannot commit itself to a reelection scheme or if the public is unsure about the politicians' time preferences. In the non-commitment case, incentive contracts may need to include a golden parachute clause.

Keywords: Incentive contracts, politicians, long-term policies, elections and contracts, golden parachute clause

JEL Classification: D72, D82

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1 Introduction

Long-term issues such as the European unemployment problem appear to be difficult for politicians to solve.[1] In this paper we suggest that competition between politicians for incentive contracts and elections can motivate them to undertake socially desirable long-term projects while at the same time preserving the democratic legitimation of politicians.

We consider a model where 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 discount factor of the politician may be smaller than that of the electorate. In such cases, the public cannot sufficiently motivate a politician to invest in long-term projects, even if the public could commit itself to reelection.

To alleviate these inefficiencies we suggest the electorate 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 discount factor is below a certain threshold, the public cannot motivate the politician to undertake long-term projects by elections alone. This also holds if the public commits itself to a reelection scheme. The politician will simply value the short-term benefits for voters too highly. 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. The politician with the larger discount factor is elected; his prospects of reelection are sure-fire and he

1 While it is apparent that there is no mechanical solution of the unemployment problem, there is a widespread consensus that over time labor market reforms would lower unemployment in Europe considerably.

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 former 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 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 the beneficial long-term project. 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 for inducing socially efficient decision-making. There are, however, a number of practical issues regarding the application of the hierarchy of incentive contracts and elections which we will address in the final section. The actual reach of the dual mechanism can only be judged after these avenues have been explored.

In this paper, we introduce competition of politicians for incentive contracts and elections as a novel element in politics. While there is no further literature on competition for incentive contracts by politicians, there is a rapidly growing literature on incentive contracts for central bankers dating back to Walsh (1995b). The government can impose a penalty if it can verify that the central bank did not try to meet its target levels.[3] In this paper, we discuss how incentive elements can be combined with the democratic requirement of pe-

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

3 For the theory of the enforcement of such arrangements and the nature of penalties see Persson and Tabellini (1993), Walsh (1995a, 1995b), Lockwood (1997) and Svensson (1997).

riodic reelections. We suggest that competition among politicians for incentive contracts and periodic reelection can be a solution to the democratic dilemma deriving from the fact that politicians may have insufficient incentives to undertake socially efficient policies.

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 paper may be useful when applied to other kinds of inefficiencies in political processes.

The paper is organized as follows: In the next section, we outline the model and our assumptions. In section 3, we consider the potentialities and limitations of the election mechanism for achieving optimal decisions. In section 4, we show that competition among politicians for incentive contracts and election induces socially optimal decisions. In section 5, we extend our analysis to the non-commitment case. In section 6, we discuss asymmetric information. Section 7 presents our conclusions.

2 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. Returns from projects are denoted by V and 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 $i = 1, 2$, 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 $\beta_i \in [0, 1]$.

Stage 2: The public decides whether the politician gets elected. We use $p_i\,(0 \leq p_i \leq 1)$ to denote the probability that politician i will be elected $(p_1 + p_2 = 1)$.

Stage 3: The 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 of presentation the long-term policy is assumed to have no short-term consequences, i.e. $V_L^1 = 0$. LTP generates positive payoffs $V_L^2 > 0$ in the next period. The last option for the policymaker is to continue with 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 apparent. 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, $(0 \leq q_i \leq 1)$.

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[4] but may generate benefits in the long term. Other examples are

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

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,[5] or investments in infrastructure requiring a temporary cutdown on consumption but producing positive returns at a later stage.

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 he is in power and realizes a social project return V in a given period, we assume that his private benefits are:

$$R_i = \alpha V \tag{1}$$

where α is some number $0 < \alpha < 1$. 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 choice (see e.g. Mueller 1989). Alternatively, the politician is genuinely concerned about the social returns he generates in given periods. We follow the latter interpretation, which allows us to focus exclusively on the discounting problem.[6]

We concentrate on the agent's utility in period 1 when politicians stand for election for the first time. We assume that the utility of an agent 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

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

where $R_i^1 = \alpha V^1$ and $R_i^2 = \alpha V^2$ are the private returns in period 1 and 2, respectively. δ_i is the discount factor of politician $(i = 1,2)$. 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. 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 assumed to be zero.

To simplify the exposition we use

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

6 The 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.

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

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

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

$$U_i^S(\beta_i, RE) = (1-m)B + m\alpha V_S^1 + \delta_i\left\{(1-m)B + mV_S^2(\alpha+\beta_i)\right\} \tag{3}$$

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

$$U_i^S(\beta_i, RE) = (1-m)B + m\alpha V_S^1 \tag{4}$$

We allow for the fact that politicians may differ in their discount factor δ_i $(i = 1,2)$. In many cases such differences are known to the public. Consider for example the election race between incumbent Kohl and 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.

We denote the expected returns from the options STP, LTP and NOT by EV_S, EV_L, and EV_N, respectively. Thus:

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

$\overline{\delta}$ is the discount factor of the public $(0 < \overline{\delta} \leq 1)$. We assume that

$$\begin{aligned} EV_L &> EV_N > EV_S \\ V_S^1 &> EV_L \end{aligned}$$

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.

3 Elections

In this section we discuss how the public can motivate politicians to undertake *LTP* if the only available instrument is the election mechanism. We assume that the public can commit itself in stage 1 to its reelection scheme in stage 4 with the two reelection probabilities $q(V_S^1)$ at STP and $q(0)$ at LTP. This gives the best chance of elections inducing elected politicians to choose *LTP*. However, no incentive contracts can be offered. Thus we obtain:

Proposition 1

Suppose $\delta_i \leq \delta(m)$ *with*

$$\delta(m) = \min\left\{\frac{m\alpha V_S^1}{\left\{(1-m)B + m\alpha V_L^2\right\}}, 1\right\} \tag{5}$$

The politician cannot be motivated by elections to undertake LTP

Proof :

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 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 $U_i^L(0, RE) = U_i^S(NRE)$ which yields:

$$\delta(m) = \frac{m\alpha V_S^1}{\left\{(1-m)B + m\alpha V_L^2\right\}} \tag{6}$$

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

■

We immediately obtain $\delta(0) = 0$ and

$$\frac{\partial\delta(m)}{\partial m} = \frac{\alpha V_S^1 B}{\left\{(1-m)B + m\alpha V_L^2\right\}^2} > 0 \tag{7}$$

Therefore, if $m > 0$, 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.[7]

4 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 still assume in this section that voters can commit themselves to a reelection scheme in stage 1, in order to compare the competition for incentive contracts and elections with the previous section. We obtain:

Proposition 2

Suppose $\delta_1 < \delta_2 \leq \delta(m)$. *There then exists a unique subgame perfect equilibrium*

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

with

$$\beta_1 = \beta_2 = \overline{\beta} = \frac{m\alpha V_S^1 - \delta_1\left\{(1-m)B + m\alpha V_L^2\right\}}{m\delta_1 V_L^2} \tag{8}$$

if

$$\overline{\delta\beta} V_L^2 < EV_L - EV_S \tag{9}$$

Proof :

The condition ensures that the public is better off committing itself to reelection and accepting a politician with $C_1(\overline{\beta}V^2)$ than setting $q_1(0) = q_2(0) = 0$ which avoids the transfer $\overline{\beta}V_L^2$ but implies STP. The public sets $q_i(V_S^1) = 0$ because they will receive negative returns in period 2, when a politician undertakes STP. Thus $U_i^S(NRE) = U_i^S(\beta_i, RE)$. By construction of $\overline{\beta}$, the first candidate is indifferent as to STP and LTP if elected. Hence $\overline{\beta}$ is determined by

$$U_1^L(\overline{\beta}, RE) = U_1^S(NRE) \tag{10}$$

7 An example in which voters cannot infer the type of project the politician has undertaken in the first period is discussed in Gersbach (1999) without, however, considering competition of politicians for incentive contracts.

which gives equation (8). Since the incentive contract is irrelevant if a candidate does not want to stand for reelection we have:

$$U_1^S(NRE) = U_2^S(NRE) \tag{11}$$

Because of $\delta_1 < \delta_2$ we have:

$$U_2^L(\overline{\beta}, RE) > U_1^L(\overline{\beta}, RE) \tag{12}$$

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.

First, suppose that candidate 2 deviates and offers $C_2(\beta_2)$ with $\beta_2 > \overline{\beta}$. 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:

$$U_1^L(\overline{\beta}, RE) \geq U_1^S(NRE) \tag{13}$$

By construction $U_1^L(\overline{\beta}, RE) = U_1^S(NRE)$. 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.

Second, suppose candidate 1 deviates to $C_1(\beta_1)$ with $\beta_1 < \overline{\beta}$. 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:

$$U_1^L(\beta_1, RE) \geq U_1^S(NRE) \tag{14}$$

But $\beta_1 < \overline{\beta}$ implies directly $U_1^L(\beta_1, RE) < U_1^S(NRE)$; thus the public will elect candidate 2 because he undertakes LTP.

Third, suppose candidate 1 deviates to $C_1(\beta_1 V^2)$ with $\beta_1 > \overline{\beta}$. 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 $\beta_2 < \overline{\beta}$, 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 $\beta_i \neq \overline{\beta}$ for at least one candidate, one of the politicians has an incentive to deviate by offering $C_i(\overline{\beta} V^2)$or by offering an incentive contract that requires slightly fewer transfers from the public[8].

■

Proposition 2 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.

In the following, we relax the assumptions upon which the result has built. In proposition 2 voters are assumed to commit themselves to a state-dependent reelection scheme. 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 next corollary.

Corollary 1

Suppose the public could only commit itself to a fixed reelection probability. Then the equilibrium with $\overline{\beta}$ *in proposition 2 still holds correspondingly with* $q_1 = q_2 = 1$ *if*

$$(1-m)B + mV_S^2(\alpha + \overline{\beta}) < 0 \tag{15}$$

The proof is analogous to the proof of proposition 2 because (15) directly implies $U_i^S(NRE) > U_i^S(\overline{\beta}, RE)$ and therefore, with incentive contracts $C(\overline{\beta} V^2)$, 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 β by $\overline{\beta}^C$. Note that $\overline{\beta}^C$ in equation (8) depends negatively on δ_1. A large δ_1 decreases the costs of transfers to the politician and harms the elected politician 2. With appropriate modifications in the proof, proposition 2 can be extended to the case when politicians are identical:

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

Corollary 2

Suppose $\delta_1 = \delta_2 \leq \delta(m)$*. There then 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

$$\beta_1 = \beta_2 = \overline{\beta} = \frac{m\alpha V_S^1 - \delta_1\left\{(1-m)B + m\alpha V_L^2\right\}}{m\delta_1 V_L^2} \tag{16}$$

if

$$\overline{\delta\beta} V_L^2 < EV_L - EV_S \tag{17}$$

5 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) and Besley and Coate (1998) and in related work by Alesina and Tabellini (1990), Tabellini and Alesina (1990) and Persson and Svensson (1989). We can easily 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 such that an elected politician today has an a priori expectation of reelection of $q_i = \frac{1}{2}$ independently of his actions in the past. This is an opposite pole to the commitment case where q_i is either 1 if the choice of LTP is expected or 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 3

Suppose $\delta_1 \leq \delta_2 \leq \delta(m)$. *There then exists a unique subgame perfect equilibrium*

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

with

$$\beta_1 = \beta_2 = \overline{\beta}^{NC} = \frac{2m\alpha V_S^1 - \delta_1\left\{(1-m)B + m\alpha V_L^2\right\}}{m\delta_1 V_L^2} \tag{18}$$

if

$$\overline{\delta\beta}^{NC} V_L^2 < EV_L - EV_S \tag{19}$$

The proof is analogous to the commitment case. The only difference is that 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 3

$$\overline{\beta}^{NC} > \overline{\beta}^{C} \tag{20}$$

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 if 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^{Pa}. The utility for a politician if he is not reelected is denoted by U_i^{para} and given by

$$U_i^{para} = p_i\left((1-m)B + mR_i^1 + \delta_i\beta V^2\right) \tag{21}$$

We immediately obtain:

Proposition 4

Suppose that $\delta_1 < \delta_2 < \delta(m)$ *and politicians can offer golden parachute contracts and the politician elected in period 1 is rejected with certainty. There then exists a unique subgame perfect equilibrium where politicians offer golden parachute contracts.*

$$\left\{C_1^{Pa}(\beta_1 V^2), C_2^{Pa}(\beta_2 V^2), p_1 = 0, p_2 = 1, q_1 = 0, q_2 = 0\right\} \tag{22}$$

with

$$\beta_1 = \beta_2 = \overline{\beta}^{NCPa} = \frac{m\alpha V_S^1}{\delta V_L^2} \tag{23}$$

if

$$\overline{\delta\beta}^{NCPa} V_L^2 < EV_L - EV_S \tag{24}$$

The proof is analogous to the previous proposition. Note that $\overline{\beta}^{NCPa}$ is determined by setting $U_1^{para}(V_L^2) = U_1^S(NRE)$ because a politician is not forced to offer a parachute contract. While we have assumed an extreme case of non-commitment in proposition 4, it is obvious that the option to offer golden parachute contracts also works for intermediate values of reelection probability when standard contracts cannot induce LTP with lower costs for the public.

6 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 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.[9] We further use $b_i\,(i = 1,2)$ to denote the beliefs of the public that politician i has discount factor δ^H when 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 in the election and the incentive contract game. We obtain:

9 The assumption appears to be plausible because of the superior knowledge politicians have about each other through their daily interaction. However, the equilibrium also exists in the case of asymmetric information of politicians about each other's discount factor.

Proposition 5

There exists a Bayesian Nash equilibrium[10]

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

with

(i)

$$\beta_1^* = \beta_1^* = \overline{\beta}^{AI} = \frac{m\alpha V_S^1 - \delta_L\left\{(1-m)B + m\alpha V_L^2\right\}}{m\delta_L V_L^2} \tag{25}$$

(ii) An elected politician chooses LTP in equilibrium

(iii)

$$\begin{array}{rcl} b_1^*(\beta_1,\beta_2) & = & w \\ b_2^*(\beta_1,\beta_2) & = & w \end{array} \tag{26}$$

(iv)

$$p_1^*(\beta_1,\beta_2) = \begin{cases} 1 & if \quad \overline{\beta}^{AI} \le \beta_1 < \beta_2 \quad or \quad \beta_1 \ge \overline{\beta}^{AI} > \beta_2 \\ 1 & if \quad \overline{\overline{\beta}} \le \beta_1 < \beta_2 < \overline{\beta}^{AI} \quad or \quad \beta_1 < \beta_2 < \overline{\overline{\beta}} \\ \frac{1}{2} & if \quad \beta_1 = \beta_2 \\ 0 & otherwise \end{cases} \tag{27}$$

$$p_2^*(\beta_1,\beta_2) = \begin{cases} 1 & if \quad \overline{\beta}^{AI} \le \beta_2 < \beta_1 \quad or \quad \beta_2 \ge \overline{\beta}^{AI} > \beta_1 \\ 1 & if \quad \overline{\overline{\beta}} \le \beta_2 < \beta_1 < \overline{\beta}^{AI} \quad or \quad \beta_2 < \beta_1 < \overline{\overline{\beta}} \\ \frac{1}{2} & if \quad \beta_2 = \beta_1 \\ 0 & otherwise \end{cases} \tag{28}$$

with

$$\overline{\overline{\beta}} = \frac{m\alpha V_S^1 - \delta^H\left\{(1-m)B + m\alpha V_L^2\right\}}{m\delta_H V_L^2} \tag{29}$$

(v)

$$\begin{array}{rcl} q_1^*(0) & = & q_2^*(0) \quad = \quad 1 \\ q_1^*(V_S^1) & = & q_2^*(V_S^1) \quad = \quad 0 \end{array} \tag{30}$$

Proof :

We first observe that for $\beta_i \ge \overline{\beta}^{AI}$ both types of politicians choose LTP independently of whether they have high or low discount factors. Thus, in equilibrium politicians choose

10 We have not found another equilibrium yet. But it is not clear whether the one in proposition 5 is unique.

LTP which validates (ii). Given the equilibrium and out-of-equilibrium beliefs, $\beta_1^* = \beta_2^* = \overline{\beta}^{AI}$ are best responses from politicians. Given the strategy of other politicians, any choice $\beta_i \neq \overline{\beta}^{AI}$ would result in zero probability of election.

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. Suppose that voters observe a pair (β_1, β_2)which is different from the equilibrium strategies. Since they do not change their a priori beliefs, the following cases can occur

- $\beta_2 > \beta_1 \geq \overline{\beta}^{AI}$
  Both politicians, if elected, would choose LTP independently of their discount factors. Thus it is cheaper for voters to elect the first politician

- $\beta_1 \geq \overline{\beta}^{AI} > \beta_2$
  The first politician will choose LTP independently of his type and will thus be elected because the public is not sure about the other one.

- $\underline{\overline{\beta}} \leq \beta_1 < \beta_2 < \overline{\beta}^{AI}$
  The politician with a high discount factor will choose LTP and the other one STP. But the public does not know which politician will undertake LTP. So politician 1 will be elected since it is cheaper for the public.

- $\beta_1 < \beta_2 < \underline{\overline{\beta}}$
  Independently of type neither politician will choose LTP. Thus, the public will elect the first politician, who offers a lower transfer βV^2.

- $\beta_1 = \beta_2$
  Since the politicians offer the same contract and they are homogeneous, both have equal probability of being elected.

- In all other cases the utility associated with the election of the second candidate is always higher for the voters.

■

Proposition 5 shows that the hierarchy of incentive contracts and elections also works under incomplete information. But $\overline{\beta}^{AI}$ is evaluated at the lower discount factor and thus the public is forced to accept transfers to the politician higher than those expected when the public knew δ to be either δ^L or δ^H in advance. The expected transfer in the latter case would amount to

$$w\overline{\beta}^{AI}V_L^2 + (1-w)\overline{\beta}(\delta_H)V_L^2 \tag{31}$$

7 Conclusion

Our simple analysis suggest 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 be examined before the dual mechanism could be proposed for democracies on a solid theoretical basis.

A critical issue for the application of incentive contracts and elections is the multi-task problem politicians usually face. Politicians in the executive and legislative branch deal with many different issues. Moreover, other issues, such as reforming health care, cannot be measured with any major precision in performance terms. The problem of how multi-task activities and measurement problems can be integrated into the hierarchy of incentive contracts and elections will need to be explored in future research (see Gersbach and Liessem 2000). There are a number of further practical issues, for instance the quantitative measures that should be used for the incentive contract. In the case of European unemployment this is relatively obvious, because the incentive contract can use the average unemployment rate. But there can be a definition problem here given that the unemployment rate is defined in many different ways. Hence there is a need to agree upon a definition that is not susceptible of change or manipulation. Also, enforcing the incentive contract will require a special court which could be a separate entity of the constitutional court.

Finally, the literature has identified a number of further important inefficiencies in the political system (see Mueller (1989), Dixit (1998), Stiglitz (1989), Persson and Tabellini (1990), Campbell 1999 Leblanc, Snyder and Tripathi (2000), Gersbach and Haller (2000)). How the dual mechanism can be applied for these kinds of inefficiencies and for more sophisticated political-economic models might be a useful extension. An even more challenging task would be the use of incentive contracts when policies are determined through

a combination of decisions at the federal and the local level. For instance, in the new framework introduced by Crémer and Palfrey (2000), the federal level can constrain local policy by mandating a minimum policy. In this framework, voters choose federal mandates that are too strict. Whether supplementing this two-tier government by incentive contracts at the federal or local level would lead to more efficient provision of public goods is an open question. The actual reach of the dual mechanism can only be judged after these avenues have been explored.

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