Capital Taxation and Electoral Accountability

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Abstract

In a representative democracy, voters can use elections to protect their property by holding politicians accountable for the tax policies they implement while in office. This paper demonstrates that performance voting can – partly or wholly – solve the capital levy problem. We characterize the "best" non-expropriating tax policies that can be sustained in a stationary Markov Perfect Equilibrium; show when this coincides with the second best tax policy; and discuss, in detail, the robustness of the result.

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1 Introduction

This paper shows that performance voting in a representative democracy can – partly or wholly – solve the capital levy problem.[4] We imagine a society in which voters elect (and reelect) politicians, who implement policies on their behalf, using the majority rule. This takes place in a sequence two-candidate elections where the incumbent runs against a challenger. Politicians are unable to commit themselves to a particular policy plan at the time of election. Voters and, more generally, decision makers in the private sector, therefore, expect politicians to pursue their own interests once in office and, without further incentives, to expropriate all capital. Voters can provide incentives by holding the politician accountable at election times for past behavior. In particular, they can elect politicians on the understanding that they will not be reelected unless they perform up to a certain, pre-specified standard, as first suggested by Barro (1973) and Ferejohn (1986). As long as politicians care about holding

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[4] See, e.g., Fischer (1980) and Benhabib and Rustichini (1997).

political office in the future, elections can serve as an implicit incentive contract and, at least partly, eliminate the capital levy problem.

We evaluate the force of this argument formally in a simple model of capital taxation. In the model, the politician has an incentive to tax capital heavily after investments have been sunk in order to increase the provision of a public good. Households realize this *ex ante* and reduce investments to inefficiently low levels. Since the households are also voters, they can use their political voice to protect themselves against expropriation, as discussed above. We show (Proposition 2) that voters by employing the (constrained) efficient stationary voting strategy can move the economy away from the third best (complete expropriation of capital) toward the second best tax policy, and sometimes even sustain the second best tax policy as an equilibrium outcome.

The rest of this paper is organized as follows. In section 2, we provide a brief literature review and relate our work to the existing literature. In section 3, we develop a simple model of capital taxation. The model has the minimum properties needed to formalize our argument and is chosen for transparency. As a benchmark, we show (Proposition 1) that a politician with life-time tenure *and* the power to commit to specific tax rates would want to tax capital but not expropriate it completely. Without commitment power, the politician wants to expropriate the existing stock of capital completely with disastrous consequences for social welfare. In section 4, we allow voters to use elections to protect themselves against expropriation. They set performance standards that terminate the tenure of a politician if he performs below expectations. We characterize the "best" capital tax rate that can be sustained by simple stationary voting strategies in Proposition 2. This result can best be understood as an upper bound on what electoral accountability can achieve in a representative democracy, as it is based on a number of critical assumptions, including that voters can coordinate their voting strategies and that politicians are perfect substitutes. In section 5, we introduce heterogenous voters and politicians, and show that electoral accountability can still provide a (partial) solution to the capital levy problem, although the force of the argument is weakened. In section 6, we discuss some empirical implications of our model.

2 The Literature

Following Kydland and Prescott (1977), a substantial literature has investigated how societies can and do deal with problems of time inconsistency.[5] Before turning to the formal analysis, we briefly relate our paper to the relevant branches of this literature. First, the fact that democratic institutions can mitigate time inconsistency problems has been pointed out previously in the literature. To our knowledge, however, this paper is the first to analyze the role played by performance voting and electoral accountability. Persson and Tabellini (1994) show that *strategic delegation* in a representative democracy can provide a solution to the capital levy problem in a two-period median voter model. They show that the median voter wants to delegate decision making power to a "conservative" politician because it provides insurance against expropriation of capital. The logic is appealing. In the period between elections, the median voter cannot change her mind. Accordingly, once a representative is elected, the median voter is "committed" to accept whatever policy the representative implements. By electing a representative with a stronger dislike for capital taxation than herself, the median voter can (under certain circumstances) insure that the capital tax implemented by representative *after* investments are sunk corresponds to the capital tax that she herself would have liked to commit to (if she could) *before* investments are sunk.[6]

While our model is also based on the notion that voters delegate decisions to politicians, the role of delegation is fundamentally different. In our model, voters use elections to hold politicians *accountable* for their policy choices. The election is similar to an implicit incentive contract, and voting is based on past performance. This mechanism is effective in preventing expropriation when politicians value public office and the future. Hence, rather than delegating decisions to an representative with a stronger dislike for expropriation (than the median), voters, in our model, exploit the fact that politicians like to be reelected; that is, it is the fact that politicians once elected enjoy being in power that is the driving force. In our model, this simple mechanism provides a (partial) solution to the capital levy problem. As shown by Persson and Tabellini (2000, chapter 4 and 9), a similar logic applies in a range of other public

[5] See Drazen (2000, chapter 4 and 5) or Persson and Tabellini (2000, chapter 12) for surveys.

[6] It is clear, as pointed out by Persson and Tabellini (1994), that this mechanism only works if all investments are made *after* the election.

finance problems. In particular, voters can reduce wasteful public spending, i.e., spending that benefits politicians at the expense of the electorate, by making the right to collect such rents in the future (reelection) contingent on a reduction in current wasteful spending. In contract, Coate and Morris (1999) provide an example in which the electoral accountability mechanism may not be sufficiently strong to prevent inefficient policy programs to persist once they have been implemented (with the consent of the electorate).

Garfinkel and Lee (2000) analyze the role of lobby groups in solving the capital levy problem. They argue that individuals with a high stake in capital taxation have an incentive to form lobby groups in order to protect themselves against high capital taxes. The lobby groups "bribe" the government to tax capital more lightly by providing, say, campaign finance. This mechanism can partly solve the capital levy problem. Our model shares the idea that the potential victims take political action to prevent expropriation. However, in our model, the potential victims voice their concern via democratic elections, while in Garfinkel and Lee's model lobbying activities is what provide voice. Garfinkel and Lee use the common agency model – developed by Bernheim and Whinston (1986) – to show their point. This implies that they assume that the lobby groups can commit to particular contribution functions and promise to pay specific sums of money depending on the policy being implemented. Without exogenous commitment power these contribution schedules are, however, not time consistent: once the politician has implemented a policy, the lobby groups have an incentive not to pay the promised reward.

Second, our paper also builds on ideas developed in the literature on incentive contracts for central banks (Walsh, 1995). This literature analyses how politicians can provide incentives for central bankers by means of an appropriately designed wage contract and/or a dismissal rule. The literature has been criticized by McCallum (1995) and Jensen (1997) for *relocating* the commitment problem rather than solving it. This critique is also relevant to our model – and to the literature on performance voting more generally. However, as long as voters can readily find a perfect substitute for the incumbent politician, they cannot do better than judging the observed policy implementation according to the announced voting rule. Therefore, our solution to the capital levy problem only requires that voters have a minimum of commitment power: if indifferent, they do what they promised to do. It is clear, however, that the assumption

of perfect substitutes is critical: when such substitutes are not available, voters would need some means of committing to particular voting strategies or otherwise making them credible in order to control politicians effectively. We discuss this issue in more detail in section 5.

Finally, our paper is related to the literature on repeated games and folk theorems. Chari and Kehoe (1990) consider a society that is ruled by a benevolent politician with life-time tenure, and show how the use of *history dependent* policy and allocation plans can help sustain non-expropriating capital tax policies, including, if the discount factor is sufficiently large, the Ramsey rule. The point is that the politician wants to preserve his *reputation* for not expropriating capital. Investors exploit this by letting the politician understand that they will stop investing if they observe expropriation. One might interpret this as saying that even societies that are ruled by a dictator or a king can avoid expropriation and sustain the rule of law – if the dictator or king is farsighted enough. Our approach is different. From a conceptual point of view, we focus on the role of accountability in a democracy rather than on the reputation mechanism. We restrict attention to Markov strategies, and do not allow voters to base the performance standard or investors to base their expectations on payoff irrelevant parts of the history of the game.[7] Instead, we allow voters to punish politicians by throwing them out of office and this is what sustains non-expropriating capital tax policies. In reality, both the accountability and the reputation mechanism are likely to play a role, and they should be viewed as complements. It is intriguing, moreover, to notice the similarities in results. The reputation mechanism is more likely to support the second best tax policy when the discount rate is close to one, but, for a given discount rate, the greater "the value of not being punished", the greater the likelihood that the second-best outcome can be sustained in equilibrium. In our model, the efficient equilibrium has the same flavor: while a high discount rate makes electoral accountability more effective, it can still work in societies where politicians do not value the future much, as long as they value political office sufficiently.

[7] It is clear, however, that the reputation mechanism does work within the structure of our model.

3 The Economic Model

We consider an economy that is populated by a continuum of identical, infinitely-lived households with measure 1. The economy has two productive sectors. The C-sector is perfectly competitive and produces a consumption good (y_t). The consumption good can be used for private (c_t) or public (g_t) consumption. The consumption good is produced by means of a linear technology using human capital (h_t) accumulated by households in the previous period as the only input. That is,

$$y_t = Rh_{t-1}, \tag{1}$$

where $R > 0$ is the (constant) marginal product of (human) capital. The I-sector is a household sector that produces human capital by means of a linear (private) technology using *effort* (e_t) as the only input. In each period, the investment in human capital is

$$I_t = e_t. \tag{2}$$

We assume that human capital depreciates fully after one period ($h_t = I_t$). That is, each new generation of a particular household dynasty needs to accumulate its own human capital. The initial stock of capital, h_{-1}, is zero.

In period t, each household rents its human capital to firms and receives (capital) income, Rh_{t-1}, in return. The government can tax capital income and use the revenue to provide public goods. We restrict attention to a proportional tax, $\tau_t \in [0, 1]$ and so, there are no non-distortionary means of raising revenue. After-tax capital income, $(1 - \tau_t) Rh_{t-1}$, is spent on private consumption:

$$c_t = (1 - \tau_t) Rh_{t-1}. \tag{3}$$

The tax revenue, $\tau_t Rh_{t-1}$, is used, by the government, to produce public goods (g_t):

$$g_t = \tau_t Rh_{t-1}. \tag{4}$$

The public good is consumed by all households as available. Each household derives utility from private and public goods, and disutility from putting in effort in the accumulation of human capital. The per-period utility function is

$$u(c_t, g_t, e_t) = c_t - \frac{e_t^{1+\chi}}{(1+\chi)} + \gamma g_t, \tag{5}$$

where $\chi > 1$ is the elasticity of disutility with respect to effort and γ indicates the importance of public consumption relative to private consumption. We assume that $\gamma > 1$. This implies that households prefer the public to the private good and provides the rational for appointing a politician to produce g_t.[8]

For a given sequence of actual and expected taxes, $\{\tau_t\}_{t=1}^{\infty}$ and $\{\tau_t^e\}_{t=1}^{\infty}$, each household maximizes $\sum_{t=0}^{\infty} \beta^t u(c_t, g_t, e_t)$, where $\beta \in (0,1)$ is the discount factor, subject to the constraints given by equations (2), (3) and $(c_t, h_t, e_t) \geq 0$ for all t. The solution to this optimization problem is

$$c_t(\tau_t, \tau_t^e) = R(1-\tau_t)\left[\beta R(1-\tau_t^e)\right]^{\frac{1}{\chi}} \quad \text{for } t = 1, 2, ...; \tag{6}$$

$$e_t(\tau_{t+1}^e) = \left[\beta R\left(1-\tau_{t+1}^e\right)\right]^{\frac{1}{\chi}} \quad \text{for } t = 0, 1, 2, ... \tag{7}$$

The associated level of public consumption follows from equation (4) and is equal to[9]

$$g_t(\tau_t, \tau_t^e) = \tau_t R\left[\beta R(1-\tau_t^e)\right]^{\frac{1}{\chi}} \quad \text{for } t = 1, 2, ... \tag{8}$$

It is convenient to define the following policy preference function:

$$U(\tau_t, \tau_t^e) \equiv u(\tau_t, \tau_t^e) - \frac{e_{t-1}(\tau_t^e)^{1+\chi}}{\beta(1+\chi)}, \tag{9}$$

where

$$u(\tau_t, \tau_t^e) \equiv c_t(\tau_t, \tau_t^e) + \gamma g_t(\tau_t, \tau_t^e). \tag{10}$$

The function $U(\tau_t, \tau_t^e)$ shows how the utility of a household is affected by the actual tax rate in period t and the tax rate expected at time $t-1$ to prevail in period t. The latter determines the effort invested in human capital in period $t-1$ and so, the tax base in period t (see equation (7)). It is important to notice that the two-sector structure of the model in conjunction with the assumption of full depreciation imply that the model can be analyzed as a sequence of two-period models.

Before we turn to the analysis of capital taxation and electoral accountability, we characterize, as a benchmark, the tax policy chosen by a politician with *life-time tenure* i) when he *can* commit (the second best) and ii) when he *can-*

[8] If $\gamma \leq 1$, the politician has no incentive to tax capital to provide public goods, and the capital levy problem does not arise.

[9] Notice that $c_0 = g_0 = 0$ because $h_{-1} = 0$.

not commit (the third best) to a particular tax policy.[10] The objective of the politician is to maximize the welfare of a representative household.

Proposition 1 *Let $\gamma > 1$. For $t = 1, 2, ...,$ the second (τ^{sb}) and third best tax policy (τ^{tb}) are stationary, and given by*

$$\tau^{sb} = \frac{(\gamma - 1)\chi}{(\gamma - 1)\chi + \gamma} \in (0, 1). \tag{11}$$

$$\tau^{tb} = 1. \tag{12}$$

Proof. See Appendix ■

In the (unrealistic) case where the politician can commit tax policy, the (second best) tax rate is positive, but less than one. The politician trades off the negative effect of capital taxation on investments with the welfare gain associated with higher public consumption. The second best tax rate is increasing in the valuation of public consumption (γ). As γ tends to 1^+, τ^{sb} tends to zero and when γ goes to infinite, τ^{sb} goes to $\chi/(1+\chi)$ – the value of τ that maximizes per-period tax revenue.

Lack of commitment power has disastrous consequences for economic welfare as an expropriating, third best capital tax ($\tau^{tb} = 1$) is being levied. This is the capital levy problem: after the private sector has undertaken its investments, taxing the capital stock is no longer distortionary and so, the politician has an incentive (for $\gamma > 1$) to increase the tax on capital income to augment the supply of public consumption. Realizing this incentive *ex ante*, the private sector reduces its investment to inefficiently low levels ($e_t = 0$) and $c_t = g_t = 0$ for all t. Welfare is reduced from $W(\tau^{sb}) = \sum_{t=1}^{\infty} \beta^t U\left(\tau^{sb}, \tau^{sb}\right) > 0$ to zero.

4 The Political Model

In most modern democracies, capital and wealth taxes are relatively modest, although there is considerable variation among countries and over time.[11] This suggests that democratic institutions in various ways resolve the capital levy problem. Below we study the role played by performance voting in this process.

[10] If lump-sum taxation were possible, then (for $\gamma > 1$) the first best allocation would be $c_t^{fb} = 0$, $l_t^{fb} = (\gamma\beta R)^{\frac{1}{\chi}}$, and $g_t = \gamma^{\frac{1}{\chi}} (\beta R)^{\frac{1+\chi}{\chi}}$.

[11] See, Sandford (2000, chapter 6). Dutta et al. (1998) and Hettich and Winer (1999, chapter 9) analyze the political economy of recent changes in capital taxation in the UK and the U.S., respectively.

4.1 Performance Voting

The theory of performance voting was originally developed by Barro (1973) and Ferejohn (1986) and builds on two key assumptions.[12] First, voters delegate decision making power to politicians, who cannot commit to policy actions at election times, and attempt to protect themselves against expropriation by holding politicians accountable for what they do while in office. Formally, there is an election each period. In these elections, the incumbent politician runs against a challenger, and the majority rule determines whether the incumbent is reelected for another term. To hold politicians accountable, voters set a performance standard, τ_t^s, immediately after the election in period $t-1$, and let the newly elected (or reelected) politician understand that he is only reelected in the election held in period t if he implements a policy, τ_t^I, that is found satisfactory compared to the standard.

Second, politicians care about holding office. They do so for many reasons. Here, we focus on one particular reason, namely that politicians like power for its own sake – a factor that we call m for megalomania and refer to as the *ego rent*. In addition, we assume that an elected politician continues his private sector activities while in office.[13] A politician's per-period utility is thus given by

$$m + u(\tau_t, \tau_t^e) - \frac{e_t(\tau_{t+1}^e)^{1+\chi}}{1+\chi}. \tag{13}$$

It is clear that the ego rent gives the politician a desire to be re-elected, and this is what allows voters to influence policy choices. Although m is likely to vary across individuals, we shall retain, for now, the assumption that m is the same for all individuals, but return to the issue of heterogenous politicians in section 5. Politicians discount the future at the same rate as households.

We can now define the game between an elected politician and voters more precisely. Politicians are drawn from the pool of households. A voting strategy is a performance standard $\tau_t^s \in [0,1]$ and a vote function, $\eta(\tau_t^I, \tau_t^s)$, that indicates whether $(\eta(.)=1)$ or not $(\eta(.)=0)$ the incumbent is reelected. An implemen-

[12] The idea that voters hold politicians accountable for actions taken while in office has received considerable empirical support (see, e.g., Lewis-Beck, 1988; Nannestad and Paldam, 1994)

[13] If we think of the unit of analysis as a household, then this basically means that the politician continues to care about the welfare of the household to which he belongs after having entered political office.

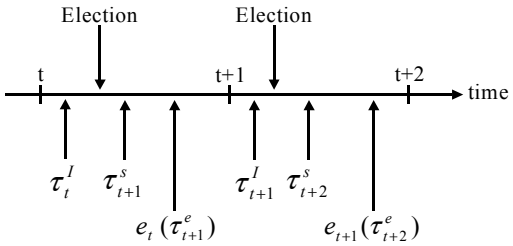

Figure 1: The timing of events

tation strategy of the incumbent is a policy rule that maps every performance standard into a policy implementation (τ_t^I).

The timing of events is illustrated in Figure 1. At the beginning of period t, the incumbent politician implements a policy (τ_t^I).[14] This is observed by voters who in the upcoming election compare the implemented policy with the performance standard set after the previous election (τ_t^s). If the politician satisfies the requirements, he is reelected; otherwise, the challenger enters office.[15] Immediately after the election in period t, the performance standard for the election to take place in period $t+1$ is set and announced publicly. Next, households form expectations about the policy to be implemented at the beginning of period $t+1$ (τ_{t+1}^e) and undertake investments in human capital accordingly (e_t). At the beginning of period $t+1$, the elected politician implements the policy, τ_{t+1}^I, and a new election is held where voters hold the politician accountable for his policy choice according to the standard τ_{t+1}^s. After that the sequence of events repeats itself.

[14] Except in period 0 and so the first politician is elected without a record.

[15] Challengers play no active role in the election. They are important only because they serve as (perfect) substitutes for the incumbent. The value of political office is sufficiently high to ensure a positive supply of office-seeking challengers whenever $m > 0$.

4.2 Political Equilibrium

We define political equilibrium as Markov Perfect Equilibrium of the game described above. A Markov Perfect Equilibrium path is a sequence of capital tax implementations, performance standards, and voting outcomes which are best responses to each other. Our model has many Markov Perfect Equilibria – some of which are better for society than others. In Proposition 2, we characterize the "best" tax rate that can be supported by a stationary Markov Perfect Equilibrium and identify when this might coincide with the second best tax policy. This result can best be thought of as the upper boundary of what can be achieved in terms of eliminating the capital levy problem by electoral accountability in a representative democracy.

Proposition 2 *(Equilibrium with performance voting) The following voting and implementation strategies can be sustained by a stationary Markov Perfect equilibrium. The voting strategy is*

$$\eta(\tau, \tau^s) = 1 \text{ iff } \tau \leq \tau^s, \tag{14}$$

$$\eta(\tau, \tau^s) = 0 \text{ iff } \tau > \tau^s, \tag{15}$$

where the performance standard (τ^s) is defined by

$$\tau^s = \max \left\{ \tau^{sb}, \ \arg\min_{\tau} \left[\frac{\beta m}{1-\beta} - \phi(\tau) = 0 \right] \right\} \tag{16}$$

where $\phi(\tau) \equiv u(1,\tau) - u(\tau,\tau)$ is the temptation of the incumbent politician to expropriate capital and $\frac{\beta m}{1-\beta}$ is the reelection reward. The implementation strategy followed by the incumbent politician is

$$\tau^I = \tau^s \tag{17}$$

and the incumbent is reelected every period.

Proof. Suppose voters each period announce τ^s as defined by equation (16). The payoff to perpetual compliance ($\tau^I = \tau^s$ for all t) is

$$C_\infty = u(\tau^s, \tau^s) + m + \beta \sum_{i=0}^{\infty} \beta^i \left(U\left(\tau^s, \tau^s\right) + m \right). \tag{18}$$

where we notice that households anticipate this outcome and invest accordingly. The politician might want to deviate from $\tau^I = \tau^s$. If so, he does it in his first

term, knowing that he is not going to get reelected and that he will return to the private sector after the next election where another politician, who is expected to comply, enters office. The best deviation strategy is to expropriate the existing capital stock ($\tau = 1$) and so, the payoff is

$$D = u(1, \tau^s) + m + \beta \sum_{i=0}^{\infty} \beta^i U(\tau^s, \tau^s). \tag{19}$$

Notice that the households expect to see τ^s implemented during the (final) term of the deviating politician and invest accordingly. Hence, any $\tau > \tau^s$ is unexpected. The incumbent will play according to the candidate equilibrium strategy, i.e., $\tau^I = \tau^s$ every period, if for all t

$$C_\infty \geq D \Leftrightarrow \frac{\beta m}{1-\beta} - \phi(\tau^s) \geq 0, \tag{20}$$

where $\phi(\tau^s) \equiv u(1, \tau^s) - u(\tau^s, \tau^s)$. With the additional assumption that the politician complies if indifferent this is necessary and sufficient. Using equations (6) and (8), we find that $\phi(\tau^s) = (\gamma - 1)\beta^{\frac{1}{\chi}} [R(1-\tau^s)]^{1+\frac{1}{\chi}}$. We notice i) $\phi(0) > 0$; ii) $\phi(1) = 0$; and iii) $\frac{\partial \phi(.)}{\partial \tau} < 0$ for all $\tau \in [0, 1]$.

Voters coordinate on the best possible performance standard subject to compliance. Notice that the sequence of incentive compatibility constraints defined by equation (20) are stationary. This implies that the constrained efficient performance can be found by solving the following problem:

$$\max_{\tau \in [0,1]} U(\tau, \tau) \tag{21}$$

subject to

$$\phi(\tau^s) \leq \frac{\beta m}{1-\beta}. \tag{22}$$

This is a well-defined concave programming problem and so, the Kuhn-Tucker first order conditions are necessary and sufficient. The Lagrangian is

$$L = U(\tau, \tau) + \lambda \left[\frac{\beta m}{1-\beta} - \phi(\tau) \right], \tag{23}$$

where λ is the Lagrange Multiplier. The Kuhn-Tucker conditions (ignoring non-negativity constraints) are

$$\frac{\partial L}{\partial \tau} = \frac{\partial U(\tau, \tau)}{\partial \tau} - \lambda \frac{\partial \phi(\tau)}{\partial \tau} = 0, \tag{24}$$

$$\frac{\partial L}{\partial \lambda} = \frac{\beta m}{1-\beta} - \phi(\tau) \geq 0, \tag{25}$$

$$\frac{\partial L}{\partial \lambda}\lambda = 0. \tag{26}$$

If $\lambda = 0$, it follows from equation (24) that

$$\overline{\tau}^s = \tau^{sb}. \tag{27}$$

If $\lambda > 0$, we notice that $\tau^s > \tau^{sb}$ because $\frac{\partial L}{\partial \tau} \mid_{\tau^{sb}} = -\lambda \frac{\partial \phi(\tau)}{\partial \tau} > 0$. Moreover, the performance standard is designed to satisfy $\frac{\partial L}{\partial \lambda} = 0$ and so,

$$\underline{\tau}^s = \arg\min_{\tau} \left[\frac{\beta m}{1-\beta} - \phi(\tau) = 0 \right], \tag{28}$$

where $\frac{\beta m}{1-\beta} > 0 \Rightarrow \underline{\tau}^s < 1$. Combing equations (27) and (28) yields equation (16). ■

Remark 1 *It is important to notice that the performance standard identified in the Proposition is credible in the sense that voters have no (strict) incentive to change their minds after the policy has been implemented. This is because voters are indifferent between electing any two candidates. Thus, they can commit to any re-election rule they like opening the door for a multiplicity of equilibria. As is standard in the literature,*[16] *we focus on the equilibrium that maximize voters' payoff subject to compliance by the politician. It is the fact that investors anticipate compliance that enables voters to improve upon the third best. This construction thus embodies two critical assumptions. First, voters are assumed to be able to coordinate on the best possible performance standard and, second, it is credible to do so because politicians are perfect substitutes. Heterogeneity among voters and politicians may therefore weaken the result. We investigate this important issue in more detail in section 5.*

Remark 2 *The performance standard is defined on the policy, rather than on voters' utility. In our model there is a one-to-one correspondence between any given policy-based standard and any given utility-based standard because the policy space is one-dimensional. The policy-based standard identified in the Proposition thus has a corresponding utility-based standard. Under the maintained assumptions of the model, voters can, as argued above, commit to any voting strategy they like subject to compliance by the politician and so, they could, alternatively, announce a "conservative" voting strategy saying that they would*

[16] See, for example, Coate and Morris (1995, p. 1226) or Persson and Tabellini (2000, chapter 4).

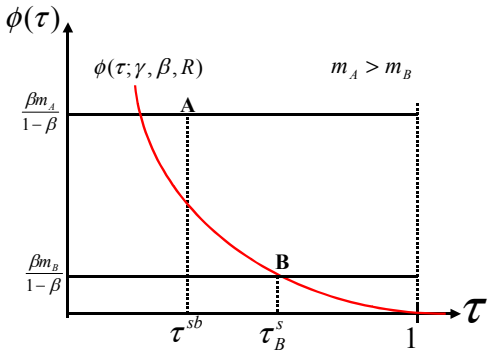

Figure 2: Political Equilibrium

not reelect a politician who implements a policy that yields too much contemporaneous utility. The "best" such strategy would lead to a sequence of policy implementations identical to the one identified in the Proposition.

The Proposition demonstrates that performance voting can, in principle, prevent (complete) expropriation of capital whenever politicians value the future ($\beta > 0$) and derive utility from being in power ($m > 0$), and can, under certain circumstances, implement the second best tax policy. The intuition is appealing. After each election, politicians face the temptation to expropriate the existing capital stock, thereby exploiting the fact that investments are sunk. The *temptation to expropriate* capital is captured by the term $\phi(\tau^s) = (\gamma - 1)\beta^{\frac{1}{\chi}} \left[R(1-\tau^s)\right]^{1+\frac{1}{\chi}}$. We notice that the temptation is large when the performance standard is demanding (τ^s is low). This is because the households expect the standard to be implemented along the equilibrium path and invest accordingly. Hence, the tougher the standard, the more there is to expropriate. The incumbent politician balances the temptation to expropriate against the desire to be reelected and earn the ego rent in the future. The *reelection reward* is captured by the term $\frac{\beta m}{1-\beta}$. Voters exploit the politician's desire to be reelected to provide incentives and reduce the capital levy problem.

The design of the incentive scheme can most readily be understood by means of Figure 2. The Figure shows the temptation to expropriate and the reelection reward as a function of the performance standard for given m, β, R, and γ.

The temptation to expropriate is a decreasing, convex function of τ^s while the reelection reward does not depend on τ^s. The reelection reward is shown for two values of m. Proposition 2 makes a distinction between two situations: one in which the second best tax policy can be sustained as an equilibrium and one in which it cannot be sustained and $\tau^s = \tau^I \in (\tau^{sb}, 1]$. When the reelection reward is large relative to the temptation to expropriate ($\frac{\beta m}{1-\beta} \geq \phi(\tau^{sb})$), voters can safely ask the incumbent to implement the second best tax each period as he will not find it worthwhile to sacrifice political office to expropriate the (second best) capital stock. In Figure 2, the equilibrium is at point A and $\tau^I = \tau^s = \tau^{sb}$ and the politician earns a "rent" corresponding to $\frac{\beta m_A}{1-\beta} - \phi(\tau^{sb}) > 0$. We can interpret this as a "folk theorem": for given $\beta > 0$, a sufficiently high valuation of political office can sustain the second best tax policy as a Markov Perfect Equilibrium. We notice that the second best can be reached when the discount factor is low as long as politicians earn a sufficiently large ego rent while in office. It is nevertheless important to notice that $\beta > 0$ is necessary to obtain any improvement upon the third best. If politicians do not value the future at all, voters cannot use the accountability mechanism to promote efficient policies. To the extent that politicians belong to political parties or political dynasties with a longer time horizon than individual politicians this and the related "last period" can, however, be overcome (Alesina and Spear, 1988).

When, on the hand, the value of reelection is low relative to the temptation ($\frac{\beta m}{1-\beta} < \phi(\tau^{sb})$), asking for τ^{sb} would backfire. The best voters can do under these circumstances is to make sure that the standard is sufficiently demanding to make the incumbent (just) indifferent between, on the one hand, satisfying the standard and getting reelected and, on the other, expropriating the stock of capital and losing office ($\phi(\tau^s) = \frac{\beta m}{1-\beta}$). In Figure 2, the equilibrium is at point B and $\tau^I = \tau^s_B > \tau^{sb}$. If voters ask for more than τ^s_B, the incumbent politician cannot resist the temptation to expropriate, households anticipate this and the economy collapses to the third best. If, on the other hand, voters ask for less than τ^s_B, they leave a rent to the politician, and could increase their own welfare by being more demanding.

It is clear from the discussion above that the ego rent – and more generally the idea that politicians value political office – and the discount rate play key roles in solving the capital levy problem. The "quality" of tax policy (as measured by how close the equilibrium policy is to the second best), however, also

depends on the other fundamentals, γ, and R, of the model. To understand the role played by these factors, consider the situation in which the second best policy cannot be sustained in political equilibrium and so the equilibrium policy is equal to

$$\underline{\tau}^s(R,\gamma;m,\beta) = 1 - \left[\frac{\frac{\beta m}{1-\beta}}{(\gamma-1)\,R^{1+\frac{1}{\chi}}\beta^{\frac{1}{\chi}}}\right]^{\frac{\chi}{1+\chi}} > \tau^{sb}. \tag{29}$$

A high return to investment (R) makes it harder to control politicians and so $\underline{\tau}^s$ is increasing in R. This is simply because the capital stock available for expropriation is larger and so the temptation to expropriate is greater. In terms of Figure 2, an increase in R rotates $\phi(\tau^s)$ up,[17] and, starting at point B, the political equilibrium moves to the right towards the third best, which is reached as $R \to \infty$. Although, it is harder to control politicians in societies in which the return to capital is large, an increase in R still has a beneficial impact on social welfare as the negative welfare effect of a higher equilibrium tax rate is more than offset by the positive welfare effect of greater productivity.

The valuation of public consumption (γ) affects $\underline{\tau}^s$ through two channels. An increase in γ makes it harder for voters to control the politician because the temptation to expropriate capital is larger. In terms of Figure 2, $\phi(\tau^s)$ rotates up, moving the political equilibrium closer to the third best. The second effect is that the second best tax itself increases. It is, therefore, not clear if the difference between the equilibrium tax and the second best tax is reduced.

5 Heterogenous Agents

Our model is based on the assumption that voters and the pool of potential politicians are (*ex ante*) identical.[18] While this assumption is commonly employed in the literature on performance voting and seems sensible in our setting insofar as avoiding expropriation is a widely shared goal among the electorate, in reality, voters and politicians are not all identical. Heterogeneity among voters and politicians raises two issues. First, if voters have different interests, it may be difficult for them to coordinate on a particular performance standard

[17] Since $\phi(1) = 0$ for all $\beta > 0$, $\gamma > 1$ and $R > 0$, changes in these variables rotates $\phi(.)$ around $(1, 0)$.

[18] It is clear that *ex post* heterogeneity in the sense of Drazen (2000: pp. 14-15) is required for the capital levy problem to arise in the first place.

for judging politicians' performance and the logic of competition may render it impossible to control politicians effectively. Second, heterogeneity in the pool of (potential) politicians implies that voters would not, in general, be indifferent between politicians at the time of election, and their ability to commit to a particular performance standard would be weakened. Moreover, in so far as heterogeneity among voters implies heterogeneity among politicians, the two issues are related.

To evaluate these critical issues more formally, we extend our basic model to allow for heterogeneity. We do so by considering each aspect in isolation. The analysis thus does not claim generality, but serves to illustrate that the basic idea of the paper – that voters can use the democratic right to dismiss underperforming politicians to (partly) solve the capital levy problem – has validity also in more complex settings with heterogeneous agents.

5.1 Heterogenous Voters

Consider a society in which the population of voters can be divided into three groups, indexed $i = \{L, M, H\}$, each with a $\frac{1}{3}$ of the electorate as its membership.[19] The three groups have a different preference for the public good. In particular, we assume that $1 < \gamma_L < \gamma_M < \gamma_H$. These differences imply that each group has its "own" second best tax policy. A simple calculation, along the lines of Proposition 1 yields, for $t = 1, 2, ..,$ that

$$0 < \tau_L^{sb} < \tau_M^{sb} < \tau_H^{sb} < 1. \tag{30}$$

In contrast, all voters agree on what is the third best policy, namely $\tau_i^{tb} = \tau^{tb} = 1$ for all i. That is, despite the difference in the taste for public versus private consumption, granted the power of government, all citizens would have an incentive to expropriate the existing capital stock. Figure 3 shows the second best tax policies for the three groups. We notice that tax rates in the interval $[\tau_L^{sb}, \tau_H^{sb}]$ are Pareto efficient, while for tax rates in either $[0, \tau_L^{sb})$ or in $(\tau_H^{sb}, 1]$ are inefficient: an increase or a decrease, respectively, would improve the welfare of all groups.

To isolate the potential coordination problem among heterogenous voters from the issue of heterogenous political candidates, we assume that politicians are recruited from a particular group (the political elite). This ensures that

[19] The analysis can easily be extended to a arbitrary number of groups with varying size.

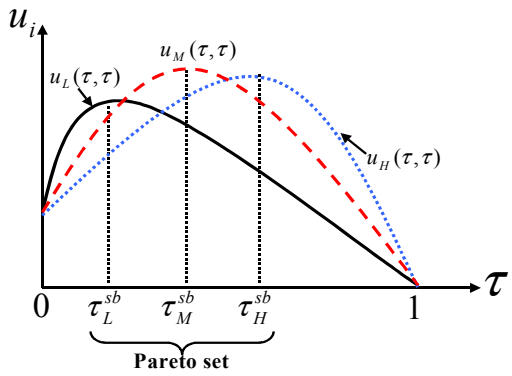

Figure 3: The second best tax policy for the three groups of voters

challenges and incumbents are perfect substitutes. For concreteness, suppose all political candidates are from group M, but this is not important for what follows.[20] We assume that voters within each group are able to coordinate their voting strategies perfectly among themselves. It seems reasonable that (small) groups of like-minded voters can do so, and that electoral competition then takes place at the group level. After each election, each group announces a performance standard of the following type: all members of group i vote in favor of the incumbent ($\eta_i(\tau_t, \tau_{it}^s) = 1$) if and only if he implements a policy belonging to $[\underline{\tau}_{it}^s, \overline{\tau}_{it}^s]$; otherwise, all members vote in favor of the challenger. Each group wants to specify an lower as well as an upper bound on what constitutes acceptable performance. The upper bound is required to avoid expropriation. The lower bound is required because each group does not want to support tax rates that are far below their second best.[21]

[20] An alternative, less ad hoc, assumption would be to introduce a "simple legislature," as in Persson, Roland and Tabellini (1999), where each group elects (and reelects) a representative separately. Importantly, each representative is recruited from a pool of identical candidates. At the beginning of the game, an agenda setter is appointed among the elected candidates. He gets to make a take-it-or leave-it policy proposal to the other candidates and needs a majority to pass the proposal. If we assume that no taxes can be levied and the legislature is dissolved if the proposal made by the agenda setter fails to command a majority, then the solution discussed in the text corresponds to the situation in which the representative from group M is chosen as the agenda setter of the simple legislature.

[21] When there is only one group of voters this is not a consideration. This is why we only specify the upper bound in Proposition 2.

The new feature is that the groups act strategically, and we must require that the standards proposed by each group is a best response to the standards proposed by the other groups (i.e., form a Nash equilibrium) taking into account the best response of the politician. Households anticipate the equilibrium and form expectations accordingly. Equilibrium then requires three things (Persson and Tabellini, 2000, pp. 236-237). First, standards cannot be so demanding that the politician wants to forego reelection; second, the equilibrium policy most be optimal for the incumbent given that he has to satisfy the performance standards of a majority only; third, no group of voters can benefit from a unilateral change in its announced voting strategy. We look for a stationary Markov Perfect Equilibrium.

Suppose that the groups announce the voting strategy

$$\boldsymbol{\tau}^s = \{(\underline{\tau}^s_L, \overline{\tau}^s_L), (\underline{\tau}^s_M, \overline{\tau}^s_M), (\underline{\tau}^s_H, \overline{\tau}^s_H)\} \tag{31}$$

at each election. The incumbent politician only needs the votes of two of the three groups to get reelected (a minimum winning coalition). We know that the incumbent politician has an incentive to expropriate, so, if he intents to get reelected, he will pick the *largest* tax rate compatible with getting the votes of at least two groups. Let τ^* be the largest such tax rate.[22] Then the payoff of perpetual compliance can be written as

$$C^M_\infty = u_M(\tau^*, \tau^*) + m + \beta \sum_{i=0}^{\infty} \beta^i (U_M(\tau^*, \tau^*) + m). \tag{32}$$

If the politician deviates, he sets $\tau = 1$ in the knowledge that reelection is going to fail. His payoff is

$$D^M = u_M(1, \tau^*) + m + \beta \sum_{i=0}^{\infty} \beta^i U_M(\tau^*, \tau^*). \tag{33}$$

Notice that $C^M_\infty \geq D^M \Leftrightarrow \phi(\tau^*) \leq \frac{\beta m}{1-\beta}$. Hence, the best response of the politician to the vector of performance standards $\boldsymbol{\tau}^s$ is

$$\phi^M(\tau^*) \leq \frac{\beta m}{1-\beta} \Rightarrow \tau^I = \tau^* \tag{34}$$

[22] τ^* does not exist for arbitrary voting strategies. In particular, if the three intervals announced by voters are disjoint, τ^* would not exist, and the politician will surely implement $\tau = 1$. As we shall see below, this could not be an equilibrium, and, at equilibrium, the intervals announced by voters are, indeed, overlapping ensuring the existence of a unique τ^*.

$$\phi^M(\tau^*) > \frac{\beta m}{1-\beta} \Rightarrow \tau^I = 1 \tag{35}$$

The announced standards ($\boldsymbol{\tau}^s$) must be a Nash equilibrium, anticipating the best response of the politician. Define $\underline{\tau}$ as the solution to $\phi^M(\underline{\tau}) = \frac{\beta m}{1-\beta}$. Notice that $\underline{\tau}$ is decreasing in m. We then get

Proposition 3 *All capital tax rates in* $[\underline{\tau}, 1]$ *can be sustained as stationary political equilibria. Moreover, there exists a* m^* *such that for* $m \geq m^*$ *some sustainable tax rates are Pareto efficient.*

Proof. Consider the following strategies. Voters announce $\underline{\tau}_i^s < \overline{\tau}_i^s$ $i \in \{L, M, H\}$ and $\overline{\tau}_L^s = \overline{\tau}_M^s = \overline{\tau}_H^s = \overline{\tau} \in [\underline{\tau}, 1]$ in each period, and the politician implements $\tau^I = \overline{\tau}$ every period. If two groups play according to the proposed strategy, the third group cannot deviate in any way that would induce the politician to change the policy implementation. Hence, the voting strategies are best responses to each other and the implementation strategy is a best response to the voting strategies. Finally define m^* as the solution to $\phi^M(\tau_H^{sb}) = \frac{\beta m^*}{1-\beta}$. Note that $\phi^M(\tau) = \frac{\beta m}{1-\beta} \Rightarrow \frac{d\tau}{dm} < 0$. Therefore, for $m \geq m^*$, we have $\underline{\tau} \leq \tau_H^{sb}$. This implies that $[\underline{\tau}, 1] \cap [\tau_L^{sb}, \tau_H^{sb}]$ is non-empty, i.e., some sustainable tax rates are contained in the Pareto set ■

The proposition demonstrates the nature of the coordination problem that arises when voters have different preferences: all incentive compatible standards can be sustained as (stationary) Markov Perfect Equilibria. While the third best is an equilibrium, it is important to notice that the three groups can achieve better equilibrium outcomes. In particular, for $m \geq m^*$, Pareto efficient outcomes (i.e., tax rates in $[\tau_L^{sb}, \tau_H^{sb}]$) can be sustained in political equilibrium. Only if the ego-rent is sufficiently low ($m \leq m^*$) does the coordination problem for sure lead to Pareto inefficient tax policies. The universal public good, g, plays an important role in reducing inter-group competition and serves as an implicit coordination devise that reduces the incentive of each group to relax its performance standard to get included in the minimum winning coalition.

5.2 Heterogenous Politicians

Politicians differ in many ways and some personal characteristics make for better leaders than others. As a consequence, politicians may not be perceived as perfect substitutes by voters, and, if the characteristics of politicians cannot be

observed directly before elections, voters face an adverse selection as well as a moral hazard problem. The simplest way to capture this within our model is to assume that politicians earn different ego rents while in office and that the precise value is private information to the politician. Clearly, voters would like to elect and reelect politicians with a high ego rent since that would enable them to control them better.[23] In order to isolate the impact of the adverse selection problem associated with heterogenous politicians from the coordination problem associated with heterogenous voters, we return to the basis specification in which voters have identical preferences.

We assume that there are two types of politicians: good and bad ones. The proportion of good politicians is P while the proportion of bad politicians is $1 - P$. Good politicians earn a larger ego rent than bad politicians, i.e., $0 < m_B < m_G$. Voters cannot observe the type of (new) candidates before an election but may be able to infer the type of an incumbent politician from observed policy choices. After each election, voters announce a reelection rule that specifies what the incumbent most do to get reelected and households form expectations accordingly. Having observed the actual policy choice, voters and households update their beliefs about the type of the politician via Bayes rule and the politician is reappointed or not in the next election.

We are interested in equilibria in which voters have no strict incentive to deviate from the announced voting strategy after policy has been implemented. Suppose that voters have somehow learned that the incumbent politician is of the good type. Then they would very much like to keep him in office in the future and ask him to keep capital taxes low. There is just one problem: in each subsequent election (after voters learned the true identity of the politician), the challenger is not a perfect substitute for the incumbent. This provides the

[23] Alternatively, we could assume that politicians differ with regard to how efficient (competent) they are at converting tax revenues into public goods. This would potentially allow voters to control politicians via the "career concern" mechanism (see, for example, Rogoff, 1990). The idea is that competent politicians have an incentive to signal that they are competent early in their careers (to get reelected), and voters have an incentive to reelect competent and dismiss incompetent politicians because they strictly prefer a competent politician to an incompetent one, even if they expect that all politicians will misbehave in the future. In our model, all politicians would have an incentive to set $\tau = 1$ irrespectively of competency if incentives for doing otherwise are not provided by voters. Thus, the "career concern" mechanism does not apply directly to the problem at hand, and, for this reason, we focus on the simpler case with different ego rents in the text.

incumbent with an incentive to expropriate, as he knows that voters would have an incentive to forgive him (reelect) rather than go through a new search process to find another good politician. As a result, without the power to commit to dismiss an under-performing politician of the good type (once identified), a simple performance standard of the type employed in Proposition 2 is not going to work: once a good politician is identified, he can and will exploit his position.

The only equilibrium in *stationary* strategies that is both superior to the third best and satisfies the "no-commitment requirement" is the one in which the identity of the incumbent is never revealed. To see this, let τ^B as the solution to $\phi(\tau^B, \tau^B) = \frac{\beta m_B}{1-\beta}$. Suppose that voters announce the performance standard $\tau^s = \tau^B$ every period. The payoff to perpetual compliance for a politician of type i is

$$C^i_\infty = u(\tau^B, \tau^B) + m_i + \beta \sum_{k=0}^{\infty} \beta^k \left[U(\tau^B, \tau^B) + m_i \right], \text{ for } i = B, G. \tag{36}$$

The payoff associated with a deviation (and resulting loss of office) is

$$D^i = u(1, \tau^B) + m_i + \beta \sum_{k=0}^{\infty} \beta^k U(\tau^B, \tau^B), \text{ for } i = B, G. \tag{37}$$

By definition of τ^B, we have $C^B_\infty = D^B$, while $C^G_\infty > D^G$ because $m_G > m_B$. Hence, both types are willing to comply if they can be assured that voters have no (strict) incentive to deviate from the announced performance standard after having observed the policy implementation $\tau^I = \tau^B$. The critical point is that voters have no such incentive because they have learned nothing from observing $\tau^I = \tau^B$ and, for that reason, any challenger is effectively a perfect substitute for the incumbent and voters are indifferent between reelecting and dismissing. Importantly, we notice that heterogeneity among politicians does not render the accountability mechanism useless as a solution to the capital levy problem: voters can get any politician to do what the "worst" politician is willing to do in exchange for permanent tenure – and that is in our model better than the third best.

While learning is not compatible with stationary voting strategies, it is likely that learning can be supported either by non-stationary voting strategies that allow more leeway for good politicians once they have been identified or by introducing trigger-like voting strategies that contingent reelection on the entire history of policy implementations made by a particular politician (as in Banks

and Sundaram, 1993, 1998). Exploring these conjectures is an interesting avenue of future research.

6 Concluding Remarks

This paper demonstrates that performance voting can, partly, solve the capital levy problem. By way of concluding, we highlight some empirical and testable implications of our analysis. In societies where democratic institutions are not fully developed, politicians can, by rigging elections in various ways, avoid being voted out of office in response to poor performance. Formally, this corresponds to situations in which the voting strategy has a lower bound, i.e., $min\ \eta(.) > 0$, and suggests that societies with less well-developed democratic institutions will, *ceteris paribus*, have a tendency to resort to expropriating means of taxation. Similarly, voters may have difficulties delivering on their promises in societies with uncertain election turnout and voter apathy. This implies an upper bound on what voters can promise to do, i.e., $\max \eta(.) < 1$, again making it harder for voters to promote efficient policies. To enhance the effective voice of the electorate, societies may develop specific democratic institutions such as separation of powers or vote of confidence procedures (Persson, Roland and Tabellini, 1997, 1999). Empirically, there is a great deal of cross-county variation in measures of political institutions. Of particular interest here is the index of voice and accountability, constructed by Kaufman et al. (1999). The index ranks countries according to the quality of their democratic institutions, using indicators of democratic accountability, freedom of the press, transparency of decision procedures and so on. Lassen (2001) finds robust evidence that the size of (general) government is positively related to this index of voice and accountability in a sample of 62 democracies in 1995. Becker and Mulligan (1998) finds that the size of government tends to be larger in countries with tax systems that are more efficient (i.e., introduce less distortions). Our theory predicts a positive relationship between voice and accountability measures and efficient methods of taxation, and thus suggests that the size of government might be affected indirectly by allowing more efficient means of taxation in societies with a well-developed accountability mechanism. It is of considerable interest to explore these empirical issues in future research.

7 Appendix

Proof of proposition 1. The second best tax problem is

$$\max_{(\tau_t)_{t=1}^{\infty}} \sum_{t=1}^{\infty} \beta^t U(\tau_t, \tau_t^e) \tag{38}$$

subject to equations (6)-(8) and the commitment technology ($\tau_t = \tau_t^e$). Inspection shows that the problem is equivalent to:

$$\max_{\tau_t} \; U(\tau_t, \tau_t^e) \;\; t = 1, 2, .. \tag{39}$$

where

$$U(\tau_t, \tau_t^e) = \frac{\chi \left(1 - \tau_t\right)^{\frac{1+\chi}{\chi}}}{1+\chi} + \gamma \tau_t \left(1 - \tau_t\right)^{\frac{1}{\chi}} \tag{40}$$

The first order condition is

$$-1 + \gamma - \frac{\gamma}{\chi} \frac{\tau_t}{1 - \tau_t} = 0 \tag{41}$$

with the solution given in equation (11). The second order condition is verified as $-\frac{\gamma}{\chi} \frac{1}{(1-\tau)^2} < 0$.

Without commitment power, the third best tax problem is to solve equation (38) subject to equations (6)-(8) taking τ_t^e as given. This is equivalent to solving for each $t \geq 1$

$$\max_{\tau_t} \; (\beta R)^{\frac{1+\chi}{\chi}} \left(1 - \tau_t\right) \left(1 - \tau_t^e\right)^{\frac{1}{\chi}} + (\beta R)^{\frac{1+\chi}{\chi}} \gamma \tau_t \left(1 - \tau_t^e\right)^{\frac{1}{\chi}}$$

or, simplifying

$$\max_{\tau_t} 1 + (\gamma - 1) \tau_t$$

with the solution $\tau_t = 1 \square$

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