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Representative democracy and capital taxation

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Abstract

In this paper we study a political model of capital taxation. Voters who differ in their relative shares of capital and labor income choose tax policy under majority rule. We compare two political regimes: direct democracy, where the voters vote directly on the policy; and representative democracy, where they elect a representative who then chooses policy. In both regimes some form of commitment by the voters is necessary to avoid excessive taxation of capital. But the necessary commitment under representative democracy corresponds closely to that provided by the actual institutions of most democracies.

1. Introduction

Why do most countries not tax capital more heavily? This question is interesting because of the 'capital levy problem': a tax on already accumulated capital is not distortionary and its revenue can be used to decrease other distortionary taxes, even though the anticipation of the capital tax can reduce savings disastrously. Traditional public finance simply defines the capital levy problem away, by assuming – explicitly or implicitly – that

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policymakers can commit tax policy in advance. But in the real world there are no institutions that permit irreversible choices of future policies.

Some recent candidates for an answer do not rely on commitment. Rogers (1986) suggests that a social planner with distributive goals may not want to overtax capital. Kotlikoff et al. (1988) cite a 'social contract' supported by an implicit reputation mechanism. Eichengreen (1990) argues that delays in implementing tax policy enable capital holders to avoid the levy by investing abroad or by otherwise hiding their wealth, thereby removing the incentive for surprise taxation. Dealing with the closely related problem of debt repudiation, Grossman and van Huyck (1988) and Chari and Kehoe (1993) discuss conditions under which an explicit reputation mechanism makes debt repudiation prohibitively costly, while Rotemberg (1989) produces a non-cooperative bargaining equilibrium between living generations where debt is honored. Tabellini (1991), also dealing with debt repudiation and intergenerational redistribution, shows that intragenerational heterogeneity and intergenerational altruism may lead to a political equilibrium with no repudiation. Eichengreen (1990) gives an account of the periodic discussion in several countries during the last century about imposing capital levies in practice.

While insightful, these papers typically do not allow realistic political institutions to play any role in the analysis.[1] To us this is unsatisfactory in that capital taxation is so closely intertwined with politics. Real-world political institutions seem particularly relevant for a positive theory of capital taxation. In virtually every democratic country, citizens do not set economic policy directly, but their *representatives* do. Also, electoral procedures provide the citizens with only limited opportunities to reverse their previous choices. Existing political institutions thereby provide at least partial commitment in the choice of political representatives, even though they do not provide commitment in the choice of future economic policy. In this paper we show that these features of representative democracy can help resolve the capital–levy problem.

To make our point, we formulate a model where decisions on taxation are taken by majority vote. We study two political institutions: 'direct democracy', where individuals vote directly on the tax rates, and 'representative democracy', where individuals vote on a representative that subsequently carries out tax policy. In both regimes, the timing of the *voters'* decisions is crucial: the capital–levy problem can be avoided only if voting takes place before investment decisions. But even though some form of commitment is necessary in both regimes, the kind of commitment is different. What is necessary under direct democracy is a commitment to a specific policy. What

[1] Tabellini's paper is an exception in assuming that policy is set by majority vote.

is necessary under representative democracy is instead a commitment to a representative body, which is then free to choose policy during its incumbency. By electing a representative that has more than an average stake in capital income, society can protect capital from overtaxation.

The result reminds us of the idea in Rogers (1986) that a social planner who worries about distribution as well as efficiency may not want to tax away all accumulated capital. It is also related to the idea in Rogoff (1985). In his model of monetary policy, Rogoff showed that the credibility problems of a low-inflation policy can be mitigated by delegating authority to a conservative central banker. Similarly, Persson and Tabellini (1990, ch. 7) showed that the credibility problems of a low capital tax can be mitigated by delegating authority to a capitalist finance minister. In this previous work, however, delegation was exogenous. Here, delegation is instead endogenous and arises as a political equilibrium in a realistic model of democratic political institutions.[2] Alesina and Grilli (1992) have applied a similar idea to the election of a central banker in their discussion of monetary policymaking in the context of European Monetary Union.

Section 2 formulates the economic part of the model. Section 3 sets the stage by studying a political equilibrium when the capital levy problem is absent, because capital taxation can be precommited. Section 4 explains the ex post incentives to tax capital when commitments are infeasible. Section 5 contrasts the political equilibria with direct and representative democracy. Section 6 concludes. An appendix collects some mathematical details.

2. Economic equilibrium

We set up a two-period model of a closed economy with many similarities to the model in Persson and Tabellini (1990, chs. 6 and 7). But we extend that model to allow for heterogeneity among individuals. Heterogeneity is limited to one dimension: the individual specific variable e^i is distributed among consumers according to a known distribution function. This distribution can have any shape, but its support is bounded within the interval $(-1, 1)$ and the mean of e^i is zero.

[2] The theme that strategic delegation can relax an incentive constraint so as to improve the equilibrium outcome is well known from other areas in economics. Vickers (1985) shows how the owners of the oligopolistic firm may raise equilibrium profit by delegating decisions to a manager who is instructed not to maximize profits. Fershtmann et al. (1991) study a related idea in a one-shot Prisoner's Dilemma game. They prove that a folk-theorem result applies if the players can delegate by contract the choice of their strategy to an agent. In our paper, by contrast, delegation does not result in a continuum of equilibria.

In this section we look at the ith individual as an economic agent. His preferences are described by the utility function:

$$H^i = [U(c^i) + d^i + V(x^i)], \tag{1}$$

where c^i and d^i are consumption in period 1 and in period 2 and x^i is the consumption of leisure in period 2 (there is no consumption of leisure in period 1). The $U(\cdot)$ and $V(\cdot)$ functions are increasing, concave and twice continuously differentiable. The consumer receives an exogenous endowment $f + e^i$ in period 1, which he splits between consumption and investment, k^i:

$$c^i + k^i = f + e^i. \tag{2}$$

The individual consumer can make negative investments, but in equilibrium aggregate investment, k, has to be non-negative. The return on investment is tied down at unity by a linear storage technology.

In period 2, the ith consumer has an endowment of $f - e^i$ units of time, which he splits between leisure and labor supply, l^i. He pays proportional taxes, θ and τ, on his capital and labor income. As with capital, the technology is linear in labor with a unitary coefficient. The after-tax factor returns are thus $(1 - \theta)$ and $(1 - \tau)$ and the second-period budget constraint can be written as

$$d^i = (1 - \theta)k^i + (1 - \tau)l^i. \tag{3}$$

Interest payments on individual borrowing are assumed to be fully deductible from the labor income tax. Hence, (3) holds even if $k^i < 0$. The linearity in the utility function makes it particularly simple to solve the consumer's problem. We can express the solution as[3]

$$c^i = U_c^{-1}(1 - \theta) \equiv C(\theta), \tag{4a}$$

$$x^i = V_x^{-1}(1 - \tau), \tag{4b}$$

$$l^i = f - e^i - x^i \equiv L(\tau) - e^i, \tag{4c}$$

$$k^i = f + e^i - c^i \equiv K(\theta) + e^i, \tag{4d}$$

$$d^i = (1 - \theta)K(\theta) + (1 - \tau)L(\tau) + (\tau - \theta)e^i. \tag{4e}$$

Thus, the idiosyncratic variable e^i captures the *relative* importance of capital income and labor income for agent i. In principle, it would be interesting to study heterogeneity in two dimensions, thus allowing for conflicting interests that emanate from earning differences separately from those that emanate from inherited wealth. But since the political equilibrium analysis becomes very hard to handle with two-dimensional heterogeneity, we stick to the simplified treatment. Note that the linearity in preferences – together with our parameterization of heterogeneity – decomposes the ith consumer's demand and supply functions into two parts: one part is non-linear in the tax rates, the other linear. However, it is only the linear part that varies across consumers; this property greatly simplifies the calculation of the political equilibria below. Since $U(\cdot)$ and $V(\cdot)$ are both concave, the directives of the factor supply functions in (4) with respect to the tax rates returns are negative: $K_\theta = -C_\theta < 0$, and $L_\tau < 0$.

[3] To guarantee that l^i is positive for all i, we also assume that $V_x^{-1}(0) < f - \bar{e}$, where $\bar{e}$ is the upper bound of e^i in the population.

By (4), we can write the ith consumer's indirect utility function as:

$$H^i(\theta, \tau) \equiv U(C(\theta)) + V(f - L(\tau)) + (1 - \theta)K(\theta) + (1 - \tau)L(\tau) + (\tau - \theta)e^i, \tag{5}$$

which is linear in the idiosyncratic variable e^i: since (1) is linear in d^i, all income effects are absorbed by second-period consumption. This linearity facilitates the description of the political equilibrium, since it implies that the voters' preferences for tax policy belong to the class of 'intermediate preferences' [see Grandmont (1978)].

The government collects all its taxes in period 2 and there are no non-distortionary means of raising revenue. The revenue requirement derives from exogenous government spending in period 2. Denote the average, or per capita, level of spending by g. Then we can write the government budget constraint in per capita form:

$$\theta k + \tau l - g = 0, \tag{6}$$

where k and l are average capital and labor supply. Because the mean of e^i is zero, it follows from (4) that $k = K(\theta)$ and $l = L(\tau)$. To simplify the analysis and with no loss of generality, we assume that g is low enough that it is possible to raise the revenue from one tax base alone. Formally:

$$g < \min[\max_\theta \theta K(\theta), \max_\tau \tau L(\tau)]. \tag{7}$$

We also constrain both tax rates to the interval $[0, 1]$. As we shall see in the following sections, equilibrium tax policy depends on the precise assumptions about the commitment technology for the tax instruments and the existing political institutions.

3. Political equilibrium with commitment in tax policy

We assume that all political decisions are taken by a majority vote. But we distinguish two political regimes: 'direct democracy', where agents vote

directly on the tax rates, and 'representative democracy', where individuals elect a (set of) representative(s), who then sets the tax rates according to his (their) individual preferences. We first study a policy regime where a commitment technology for the tax rates is available: that is, the tax rates for period 2 are set once and for all in period 1 before consumers make their investment decision. This is not realistic, but provides a useful benchmark. When such commitments of the policy instruments are possible, the political regime does not matter for the outcome. For concreteness, let us assume that the vote is taken directly on tax policy. A political equilibrium is defined as a vector of tax rates, (τ^*, θ^*), such that there are no other tax rates preferred to (τ^*, θ^*) by a majority of the voters.

The optimal tax policy from the viewpoint of the ith individual maximizes his indirect utility in (5) with respect to the tax rates – θ and τ – subject to the private optimality conditions in (4) and the government budget constraint in (6). It is useful to reduce this two-dimensional problem to a choice of the capital tax only. To do that we define a labor tax function, $\tau = T(\theta)$. This function solves the government budget constraint given θ and g and private optimal behavior. It is implicitly defined by

$$\theta K(\theta) + T(\theta)L(T(\theta)) \quad g = 0 . \tag{8}$$

The partial derivative of the labor tax function,

$$T_\theta(\theta) = -\frac{K(\theta) + \theta K_\theta(\theta)}{L(T(\theta)) + T(\theta)L_\tau(T(\theta))} , \tag{9}$$

is negative, as long as taxes are set on the rising portion of the 'Laffer curve'.

Consider how a change in θ affects the ith individual's welfare. By the envelope theorem, we can find this welfare effect by differentiating (5) with respect to θ, having replaced τ with $T(\theta)$. Using (4) we obtain:

$$H^i_\theta = -(e^i + k) - T_\theta(\theta)[L(T(\theta)) \quad e^i] . \tag{10}$$

At an interior optimum – that is, for $k > 0$ and $0 < \theta < 1$ – the optimal tax policy for the ith individual sets θ such that $H^i_\theta = 0$. It is illuminating to rewrite this first-order condition as

$$\frac{k + e^i}{k} \left| 1 + \frac{\tau}{1 \quad \tau} \frac{\varepsilon L}{\varepsilon \tau} \right| = \frac{I}{I} \quad \frac{e^i}{I} \left| 1 + \frac{\theta}{1 \quad \theta} \frac{\varepsilon K}{\varepsilon \theta} \right| , \tag{11}$$

where $\varepsilon X/\varepsilon y < 0$ denotes the elasticity of X with respect to y.

To interpret (11), consider first the solution for an individual with an average endowment, $e^i = 0$. Of course, this is also the solution in the representative consumer case, when the distribution of e^i has all its mass at the point $e^i = 0$. This solution has normative appeal. Since the individual utilities are linear in e^i and the mean of e^i is zero, it is the solution to the utilitarian planning problem with heterogeneous individuals (under the constraint that tax rates have to be the same for all individuals). Because of the linearity, the equilibrium with $e^i = 0$ is also the tax policy preferred by an arbitrary individual who decides under a veil of ignorance about his own endowment, e^i. In any case, when $e^i = 0$, (11) reduces to the familiar Ramsey condition – the distortion on the last unit of revenue is equated across the two tax bases – which calls for a lower tax rate on the more elastic tax base.

But when $e^i \neq 0$, the redistributive effects of capital taxation modify this pure efficiency condition. For someone with e^i positive, capital income is relatively more important than labor income. He therefore prefers a lower θ and a higher τ than someone with $e^i = 0$. The opposite is true if $e^i < 0$.

This intuitive argument is formalized in section A1 of the appendix where we show that the optimal value of θ for the ith voter is a continuous and decreasing function of e^i. We also show that, under a mild condition, the second-order conditions for a maximum are satisfied (that $H^i_{\theta\theta} < 0$). In this paper we do not worry about the well-known possibility that the optimal tax problem may be non-convex, but assume that the voters' first-order conditions have at most one interior solution to $H^i_\theta = 0$. In this case, the voters' preferences are single peaked. Under these conditions, a majority voting equilibrium exists and the decisive vote is cast by the voter with the median endowment, e^m. Equilibrium tax policy in the political equilibrium with commitment is then $[\theta(e^m), T(\theta(e^m))]$, where $\theta(e^m)$ is the value of θ that solves Eq. (11), with e^i replaced by e^m.

In the realistic case when the median voter has a negative endowment – so that capital is relatively concentrated in the population – capital is thus taxed more heavily in a political equilibrium with commitment in tax policy than it would be in a utilitarian optimum. In this sense, majority rule in tax policy leads to a distortion, even if commitments are possible. In what follows we shall retain the assumption that $e^m < 0$.

4. Discretion in tax policy

We now discuss the more realistic policy regime where the tax rates cannot be set once and for all in period 1. Instead they are set in period 2, when all agents have already made their investment decision. As is well known, this significantly changes the policy problem, because taxing capital no longer has any disincentive effects on period-1 investment. If investors understand the policymaker's ex post incentives, they expect the tax rate on capital to be set accordingly. To determine the equilibrium, we therefore have to look at the ex post policy problem.

With average capital predetermined, we can use the government budget constraint to implicitly define an ex post labor tax function $\hat{T}(\theta, k)$:

$$\theta k + \hat{T}(\theta, k)L(\hat{T}(\theta, k)) \quad g - 0 , \tag{12}$$

with a partial derivative:

$$\hat{T}_\theta(\theta, k) = - \frac{k}{L(T(\theta, k)) + \hat{T}(\theta, k)L_\tau(\hat{T}(\theta, k))} . \tag{13}$$

$\hat{T}_\theta(\theta, k)$ is non-positive on the rising portion of the Laffer curve for the labor tax, and strictly negative if $k > 0$. To express the ith individual's preferences over taxes, we follow the same approach as in the previous section. The ex post welfare effect of a change in θ for the ith individual, $\hat{H}^i_\theta$, is given by the same expression as (10), except that T_θ is replaced by the derivative of the ex post labor tax function, $\hat{T}_\theta$:[4]

$$\hat{H}^i_\theta = \quad (e^i + k) - \hat{T}_\theta(\theta, k)[L(\hat{T}(\theta, k)) - e^i] . \tag{10'}$$

Let us evaluate $\hat{H}^i_\theta$ at the point $\theta = g/k$, where the capital tax is large enough to finance all of g so that τ can be set to zero. At this point, $\hat{T}_\theta = -k/L(0)$ so that

$$\hat{H}^i_\theta = - e^i[k/L(0) + 1] . \tag{14}$$

By (14), at $\theta = g/k$, $\hat{H}^i_\theta$ if zero if $e^i = 0$. This is natural because an individual with an average endowment has no stake except efficiency in the distribution of the tax burden across tax bases. His ex post optimal policy therefore collects all taxes from the completely inelastic factor – capital – and eliminates all taxes on the elastic factor – labor. Of course, this is an illustration of the classical 'capital levy problem' in the context of our model. For a 'worker' with $e^i < 0$, income distribution concerns strengthen this temptation to tax capital ex post; $\hat{H}^i_\theta$ in (14) is positive and the optimal policy $[\theta = g/k, \tau = 0]$ becomes a corner solution to the ex post problem. This policy is relevant as long as $k > g$. If $k < g$, the capital tax cannot raise the necessary revenue, θ is set at unity, and the remaining revenue is raised by the labor tax.

For a 'capitalist' with $e^i > 0$, income distribution concerns instead weaken the temptation to tax capital, $\hat{H}^i_\theta$ in (14) is negative at $\theta = g/k$ and a policy with $\theta < g/k$ and $\tau > 0$ becomes ex post optimal. As e^i rises, the income distribution concerns gradually become more important and the ex post optimal θ falls. If $k > 0$, individuals above some critical value of e^i in fact opt for a corner solution, where capital is not taxed at all. This is proved by showing that for large enough e^i (but less than 1) and $k > 0$, the expression in (10') turns negative, at all values of θ in the interval $(0, 1)$.[5] We can thus always find an individual that cares enough about capital that he does not want to tax it at all ex post, despite the associated efficiency gains.

The discussion in this section implies that the ex post optimal tax policy for the ith individual, obtained by setting $\hat{H}^i_\theta$ in (10') equal to zero, can be summarized by a function:

$$\hat{\theta}^i = \hat{\theta}(k, e^i) . \tag{15}$$

This function is illustrated in Fig. 1. For $e^i \leq 0$, we have the corner solution $\hat{\theta}^i = \min(g/k, 1)$. But for $e^i > 0$, and if $k > 0$, $\hat{\theta}^i$ falls monotonically in e^i – see the appendix – until for some positive e^i it hits the other corner, $\hat{\theta}^i = 0$.[6]

An important qualification to the above discussion is in order.[7] In reality, it is hard to discriminate in taxation between remuneration of forgone leisure and accumulated human capital, respectively. Zero tax brackets in some countries are large enough to exclude forgone leisure from taxation. If so, it is only income from physical and human capital that is effectively

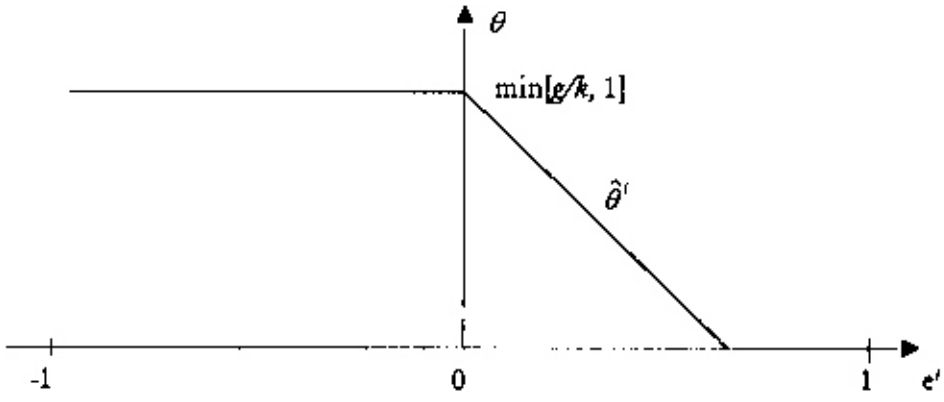

Fig. 1.

[4] A procedure similar to that of section A1 in the appendix proves that the second-order conditions are satisfied here too (that is, $\hat{H}^i_{\theta\theta}$ is negative at the optimum), and that preferences are single peaked.

[5] To see this, note that the first term in (10') is always negative for $e^i > 0$. The second term is non-negative but it tends to zero as e^i approaches L, for any θ. Clearly, then, as e^i approaches $L(1 - T(\theta))$, $\hat{H}^i_\theta$ becomes negative for all values of θ in the interval $(0, 1)$.

[6] If $k = 0$, by the government budget constraint, $\tau = g/L$ and θ is determined exclusively by the sign of e^i.

[7] The following perceptive qualification was suggested to us by a referee.

taxed. Obviously, a similar capital–levy problem applies to the taxation of human capital.

5. Direct versus representative democracy

5.1. Direct democracy

Suppose counterfactually that the existing form of government is direct democracy. But, unlike in section 3, the tax rates cannot be decided on in period 1. This means that people vote on tax policy in period 2. Our analysis above implies that a voting equilibrium in period 2 exists and that the person with the median endowment is decisive. An equilibrium policy, θ, must therefore respect the 'incentive constraint' that (15) is satisfied for the median voter:

$$\hat{\theta}^{m} = \hat{\theta}(k, e^{m}), \tag{16}$$

But since $e^{m} < 0$, it follows from the discussion in section 4 that the median voter chooses the corner solution $\hat{\theta}^{m} = \min(g/k, 1)$.

For $\hat{\theta}^{m} = g/k$ to be the equilibrium, it has to be consistent with individual ex ante optimality in investment. That is to say, $\hat{\theta}^{m}$ must solve the equation

$$\hat{\theta}^{m} K(\hat{\theta}^{m}) = g. \tag{17}$$

Equation (17) has at least two solutions, however. It has exactly two solutions, when the ex ante revenue function $\theta K(\theta)$ is globally concave.[8] The revenue requirement can either be fulfilled at a low tax rate and a high tax base, or else at a high tax rate and a low tax base. (The revenue from the capital tax is independent of the labor tax rate only because of the simplifying assumptions of our model.) Both of these equilibria are therefore consistent with perfect foresight and both satisfy the political incentive constraint in (16). In addition, we have an equilibrium with $\hat{\theta}^{m} \geq \tilde{\theta}$, where $\tilde{\theta}$ is the tax rate which yields $k = 0$. In this 'full expropriation equilibrium' everyone expects to be fully expropriated and saves nothing, so that $k = 0$. And given that $k = 0$, $\theta \geq \tilde{\theta}$ is ex post optimal for the median voter (see also footnotes 6 and 8). Persson and Tabellini (1990, ch. 6) further discuss this multiplicity issue and point out that it is pervasive in dynamic taxation models without a commitment in policy. The multiplicity problem is similar to what appears in models of bank runs. It reflects a coordination failure between investors, who simultaneously have to choose whether or not to trust the government.

Whichever of these equilibria the economy ends up in, the outcome is worse than in the voting equilibrium with commitment in taxation, when evaluated either by the median voter or by a utilitarian social welfare function. From either point of view the binding incentive constraint drives the economy from a second-best to a third-best equilibrium. Strictly speaking, we cannot make a Pareto ranking among the equilibria, since the voters with little capital and much labor may be better off here than in the equilibrium under commitment. (The disastrous discretionary equilibrium with zero capital is worse for everybody, though.) Since our focus in this paper is not on multiplicity problems, we will simply assume in what follows that the government somehow is able to coordinate expectations by announcing the lowest of the tax rates that satisfies Eq. (17).

5.2. Representative democracy with a president

In reality, direct voting on tax rates is very rare. Almost all Western democracies have constitutions that delegate such decisions to elected representatives. Let us therefore study representative democracy in our model.[9] In this subsection we assume that the individuals in the economy elect a single representative with a particular endowment and that the representative then is free to carry out his preferred policy.[10] Thus, this subsection studies a 'presidential democracy', or perhaps more precisely an 'elected dictator'. The next subsection extends the analysis to the election of a legislature. A political equilibrium under representative presidential democracy is then defined by the condition that, at the time of the election, a majority of the voters prefer the elected representative to any other possible representative in a pair-wise comparison.[11] Naturally, the voters have rational expectations and anticipate that – once in office – the president will behave according to the incentive constraint (15). If this is the political institution, the timing of the elections is critical. For elections held in period

[8] A sufficient condition for $\theta K(\theta)$ to be globally concave is that $U_{cc}(\cdot)$ is non-negative [this follows from the definition of $K(\theta)$ in (4)], a property satisfied by any utility function with non-increasing absolute risk aversion. For example, if $U(c) = \log c$, $\theta K(\theta)$ takes the form $\theta[f - 1/(1-\theta)]$, such that $\theta K(\theta)$ is positive as long as $\theta < \tilde{\theta} = 1 - 1/f$. If the ex ante revenue function is not everywhere concave, Eq. (17) may have more than two solutions thus allowing for more than two equilibria.

[9] It would be interesting to undertake a comparative study of current and historical exceptions to this rule, such as the case of Switzerland and the New England town meeting (the latter was pointed out to us by a referee). Such an empirical study is outside the scope of the present paper, however.

[10] What we call a policymaker endowment can also be interpreted loosely as reflecting his 'ideology' (i.e. the endowment of the constituency that he wants to protect). Lott (1987) provides evidence in favor of ideology-motivated political representatives.

[11] Thus, we implicitly assume free entry of candidates.

2, the outcome is obvious: the individual with endowment e^m is elected and the equilibrium is the same as under direct democracy.

The equilibrium is more interesting if elections are held at the beginning of period 1 and the election outcome is known before any investment decision is made. Consider first what happens once individual j has won the election. The equilibrium continuation must satisfy the private first-order conditions in (4), as well as the ex post incentive constraint (15). Combining (4) and (15), tax policy in the equilibrium continuation is defined by

$$\theta^j = \hat{\theta}(K(\theta^j), e^j)\,. \tag{18}$$

If $e^j < 0$, then the equilibrium is at the corner $\tau = 0$, like under direct democracy. If, on the other hand, $e^j > 0$, then there is an equilibrium continuation where positive revenue is collected from the labor tax. As explained at the end of subsection 5.1, we focus on the equilibrium continuation, which corresponds to the lowest tax rate, θ^j, that satisfies (18). For such an equilibrium, (18) implicitly defines θ^j as a function of e^j:

$$\theta^j = \varphi(e^j)\,. \tag{19}$$

Section A2 of the appendix proves that the function $\varphi(\cdot)$ is continuous and, for $\theta \in (0, 1)$, strictly decreasing in e^j. Thus, in this equilibrium continuation, the higher is the relative capital income of the president, the lower is the tax rate on capital.

Let us now find out who wins the elections. At election time, the tax rate preferred by the ith individual is the value of θ that solves the ex ante optimality condition in (11). As shown in section 3, this preferred tax rate is a decreasing function, $\bar{\theta}(e^i)$, of the voter's endowment. But we can translate any preferred tax rate to a preferred representative for individual i, e^{iR} say, by inverting the equilibrium continuation function in (19):[12]

$$e^{iR} = \varphi^{-1}(\bar{\theta}(e^i))\,. \tag{20}$$

Clearly, e^{iR} is an increasing function of e^i [since both $\varphi(\cdot)$ and $\bar{\theta}(\cdot)$ are decreasing functions], such that $e^{iR} \geq 0$ if $\bar{\theta}(e^i) \geq 0$. Hence, the elections are won by the candidate preferred by the median voter; namely by an individual with endowment $e^{mR} = \varphi^{-1}(\bar{\theta}(e^m))$. Note that $e^{iR} \geq e^i$ for all e^i, and in particular $e^{mR} \geq e^m$, with strict inequality if $\bar{\theta}(e^m) < \min(1, g/k)$. Thus, the president elect in equilibrium holds more capital than the majority of the voters. Intuitively, the voters realize that in period 2 any elected president will face a zero ex post elasticity of capital supply, and hence will want to tax capital a lot. But since elections are held before the investment decision, the elasticity of capital supply perceived by the voters is positive. By electing a 'more conservative' president (a president who is relatively more endowed with capital), the voters reassure investors that the ex ante optimal capital tax rate is going to be ex post incentive compatible.

The main implication of this finding is that in equilibrium the president implements the policy $\theta(e^m)$ which is ex ante optimal for the median voter in period 1. By delegating the responsibility for taxation to a democratically chosen president before investment decisions are made, the majority implements the equilibrium second-best tax policy of the commitment regime in section 3.

5.3. *Representative democracy with a legislature*

In most democratic societies the choice of tax policy ultimately lies with the legislature rather than with the president. We now argue that the previous results also apply to a parliamentary democracy in which the voters elect a legislature, and the legislature then chooses the policy under majority rule.

Suppose that voters are divided into separate districts. At the beginning of period 1 each district elects a representative to the legislature. In period 2 the legislature chooses the policy under majority rule.

Consider first how the legislature chooses policy. Since this choice is made after the investment decision, each legislature evaluates the policy according to the ex post incentive constraint (15). Thus, the legislature choice is analogous to that under direct democracy with no commitment: the equilibrium policy is that preferred ex post by the median voter *in the legislature*.

This result is important, because it implies that the voters do not behave strategically when electing a representative from their district: since the intensity of legislators' preferences does not matter for the legislative outcome, the voters have no incentive to misrepresent their own preferences when they elect a representative. Specifically, a voter with endowment e^i wishes to elect a representative with endowment e^{iR}, as defined in (20). Such a representative will find it ex post optimal to vote in the legislature in favor of the tax rate preferred ex ante by the ith voter. Thus, just like with a president, in each district the elected representative is that preferred by the median voter in that district; and the elected representative is more 'to the right' than the median voter.

Combining these two results we conclude that in this equilibrium, too, the legislature enacts the policy which is ex ante optimal for the pivotal voter. There is, however, a difference between a parliamentary and a presidential representative democracy. The identity of the pivotal voter in a parliamentary representative democracy depends on how the voters are allocated to

[12] Without loss of generality, we assume that at $\bar{\theta} = 0 (\bar{\theta} = 1)$, e^{iR} coincides with the lowest (highest) e^i such that $\bar{\theta}(e^i) = 0 (\bar{\theta}(e^i) = 1)$.

different districts, and need not be that of the individual with median endowment.

5.4. Discussion

Above, the representative is elected in period 1 before any investment decision is made and the voters do not have the option of removing their representative from office in period 2. Our model of representative democracy thus assumes that the voters can commit to their choice of representative. We would like to argue that existing political institutions indeed provide such commitment capacity.

In most Western democracies the voters do not have the legal power to revoke a presidential mandate or to dissolve the legislature, except at the time of elections. Naturally, the president could resign or the legislature could vote to call early elections. But note that this would never be an equilibrium choice in our model, at least not for the purpose of approving a surprise capital tax: since it is ex post optimal for the elected representatives to enact the equilibrium policy, they have no incentive to give the voters an option to reoptimize. Therefore the voters become committed to hold the representative in office for a period that is dictated by the statutory election dates.

This point is quite general. One often encounters the argument that a democratic society cannot precommit its future course of action except through reputation, because a (qualified) majority of the voters can always legitimately renege on previous democratic decisions. But this argument is misleading. Very few collective decisions are taken under direct democracy. Most relevant decisions, including the most fundamental constitutional decisions, are generally delegated to a body of representatives. Unless this elected body chooses to resign, the only time society can legitimately renege on itself is at the statutory election date. Of course, the possibility remains that the citizens may violate the constitution and overthrow the government through violence or in some other illegitimate way. But societies have many different ways of imposing large prospective costs on individual citizens contemplating such action. In the language of modern political theory, these costs give the representative considerable 'gate-keeping authority' vis-à-vis the voters.[13]

The general point of this paper is that in modern democracies voters choose representatives, rather than policy actions. Rational voters would make this choice by taking into account any ex post incentive compatibility

[13] The question of what enforcement mechanism prevents the citizens from violating the constitution and overthrowing a government is addressed in two recent interesting papers by Grossman (1990) and Grossman and Noh (1990).

condition faced by the delegates. Hence, democracy by delegation may enable society to commit its future course of action. Naturally, this general point can be applied iteratively. The legislature can choose to delegate decisions to a committee system as discussed for instance by Weingast and Marshall (1988). The committee system can delegate to an independent agency, and so on. Each layer of delegation can hold some commitment capacity, provided that it is illegitimate or costly to reverse previous appointments of delegates, so that the 'agent' in each layer of delegation has enough gate-keeping authority vis-à-vis its 'principals'.[14]

6. Conclusion

We have shown how a political institution – reminiscent of the representative democracy we find in most Western economies – can help society deal with the incentives to tax already accumulated capital. By voting for representatives who have a larger stake in protecting capital than the majority of the population, the majority can indeed implement the equilibrium second-best tax policy. The advantage of 'right-wing candidates' might actually be enhanced in a less stylized model. For if a right-wing government induces more investment, it may lead to higher after-tax wages than a more left-wing government, even if labor taxes were relatively high.

Our result that representative democracy can precisely replicate the second-best commitment outcome under direct democracy is not robust to sensible extensions of the analysis. Suppose that government spending was uncertain. The median voter's second-best policy under commitment would then be a state-contingent rule that called for high taxes on capital if spending was high. But an elected conservative representative would then tax capital too little. This suggests a tradeoff between credibility and flexibility, as in Rogoff's (1985) problem of selecting the right central banker.

Our result that political incentives may improve the equilibrium outcome is in stark contrast to most of the public-choice literature. What is different in our analysis is that the policy problem includes another binding incentive constraint, namely the temptation to tax capital. In the right institutional setting the political incentives can relax this incentive constraint and improve the equilibrium policy. This is not just a subtle theoretical point. Following the Glorious Revolution of 1688, the English Crown delegated its power to tax to Parliament, which in turn was largely made up of representatives of the financial community. North and Weingast (1989)

[14] Ferejohn (1990) shows that gate-keeping authority of congressional committees vis-à-vis congress is crucial for committing congress to a desirable policy.

argue that these constitutional changes enabled the Crown to borrow in amounts previously unthinkable and led to the evolution of modern capital markets.[15] By delegating its powers, the Crown acquired a credible commitment technology.

Another example of how democratic delegation can relax an incentive constraint is provided by Persson and Tabellini (1992). There, the voters realize that their elected governments are engaged in a non-cooperative game of international fiscal policy coordination. They elect a representative who is particularly apt at playing this game and bring the equilibrium closer to the Pareto frontier of the game.

Finally, this paper has discussed the importance of political institutions from the viewpoint of a positive theory of policy. But the analysis also points in the direction of a tradeoff in normative institution design. The commitment capacity of representative democracy in the model would be stronger the farther apart were the statutory election dates. However, having elections farther apart might be disadvantageous in that it would limit the voters' ability to get rid of non-performing incumbents and thereby resolve moral-hazard and adverse-selection problems among policymakers.[16]

Appendix A

A.1. Second-order conditions and monotonicity of $\hat{\theta}(e^1)$

Setting Eq. (10) equal to zero implicitly defines θ as a function of e^1, $\bar{\theta}(e^1)$. By (9), clearly the optimum must be on the rising portion of the Laffer curve. On the rising portion of the Laffer curve, H^1_θ is continuous. Hence, so is $\bar{\theta}(\cdot)$. The second derivative of $H^1(\cdot)$ is

$$H^1_{\theta\theta} = [-K_\theta + (2K_\theta + \theta K_{\theta\theta})(L - e^1)/(L + \tau L_\tau)] + T^2_\theta[-L_\tau + (2L_\tau + \tau L_{\tau\tau})/(L + \tau L_\tau)]. \tag{A1}$$

Suppose that $K_{\theta\theta}$ and $L_{\tau\tau}$ are negative or, if positive, not too large [this is equivalent to a restriction on the third derivatives of $U(\cdot)$ and $V(\cdot)$]. Then it is easy to show that $H^1_{\theta\theta}$ is negative at the optimum. The second term in (A1) is always negative (because L is below unity and L_τ negative, but $L + \tau L_\tau$ is positive on the rising part of the Laffer curve). The first term is

[15] In the nine years following these changes, government debt grew from about 3 percent to about 40 percent of estimated GNP, while interest rates fell.

[16] Rogoff (1990) discusses precisely this kind of tradeoff in his interesting analysis of the design of electoral rules. In this case, the benefit of having distant elections is that it diminishes costly signalling of incumbents before elections.

also negative at the optimum. To see this, note that the final fraction is above unity, because at the optimum it satisfies $(L - e^1)/(L + \tau L_\tau) = (K + e^1)/(K + \theta K_\theta)$. If e^1 is positive, the RHS of this expression is clearly above unity, while the LHS is clearly above unity if e^1 is negative. So the second-order condition for an optimum is satisfied. If $H^1_\theta = 0$ has at most one solution for $\theta \in (0, 1)$, then the voters' preferences are single peaked. When $H^1_\theta \neq 0$ for all $\theta \in (0, 1)$, the peak corresponds to a corner solution. Otherwise it is the interior optimum.

To see that $\hat{\theta}(e^1)$ is monotonic, all we have to do is to evaluate $H^1_{\theta e}$. Doing that gives

$$H^1_{\theta e} = -(1 - T_\theta), \tag{A2}$$

which is negative for all e^1. It follows that $\bar{\theta}_e(e^1) = -H^1_{\theta e}/H^1_{\theta\theta}$ is negative. So the function $\bar{\theta}(e^1)$ is continuous and monotonically decreasing.

The demonstration that $\hat{\theta}(k, e^1)$ is continuous and monotonically decreasing in e^1 proceeds along similar lines. Again, to guarantee single peakedness of the voters' preferences, we have to assume that the condition $\hat{H}^1_\theta = 0$ admits at most one solution for $\theta \in (0, 1)$.

A.2. Monotonicity of $\theta^1 = \varphi(e^1)$

Rewrite (18) as

$$\theta^1 - \hat{\theta}(K(1 - \theta^1), e^1) = 0. \tag{A3}$$

Equation (A3) implicitly defines $\theta^1 = \varphi(e^1)$. By the implicit function theorem, $\varphi(\cdot)$ is continuous and

$$\varphi_e(e^1) = \frac{\hat{\theta}_e}{1 - \hat{\theta}_k K_\theta}. \tag{A4}$$

The function $\hat{\theta}(k, e^1)$ is defined implicitly by the condition $\hat{H}^1_\theta = 0$. As argued in section A1 of this appendix, $\hat{\theta}_e < 0$. Repeating the same procedure as before, it can be shown that

$$\hat{\theta}_k = \theta/K + a, \tag{A5}$$

where $a = (e^1 + \tau L_\tau)^2/[e^1(k + e^1)(-L_\tau + \tau L_{\tau\tau})] > 0$. Consider the denominator on the right-hand side of (A4). We have

$$1 - \hat{\theta}_k K_\theta = 1 + (\theta/K)K_\theta - aK_\theta. \tag{A6}$$

As shown in the text, $K_\theta < 0$. By assumption, we only consider the continuation equilibrium with the highest capital stock. Clearly, such an equilibrium must be on the rising portion of the Laffer curve for capital

taxation. This restriction implies $K > -\theta K_g$. By (A6), we then obtain that $1 - \hat{\theta}_g K_g > 0$. Therefore, by (A4), $\varphi_g(e^l)$ is negative.

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