Oligarchy, Democracy, and State Capacity*

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June 6, 2011

Abstract

We develop a dynamic political economy model in which investment in the state capacity to levy taxes and deter crime is a policy variable, and we study the evolution of state capacity when policy is chosen by an elite. We show that democratization in the sense of expansion of the elite leads to an increased investment in state capacity and to a reduction in illegal activities, and has non-monotonic effects on tax rates as it reduces the willingness of the elite to engage in particularistic spending but enhances its willingness to provide public goods. Depending on initial conditions, consensual political changes may lead either to democratization or to the entrenchment of an immovable elite.

keywords: state capacity; democratization; oligarchy.
JEL D72, H11

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1 Introduction

The capacity of the state to raise taxes, to regulate economic activity, and protect its citizens from crime vary very widely across countries. While the capacity of the state may be assumed as given at any moment, it may be affected over time by government decisions regarding the build up of a motivated and well-trained bureaucracy, an effective police force and a properly working judicial system. From this perspective, the capacity of the state can be considered a sort of capital that can be accumulated (or depreciated) over time. Naturally, the government's willingness to invest costly resources in building up state capacity will depend on the objectives and the time horizon of the government.

Throughout history, up to the advent of modern democracy, political power has been concentrated in an entrenched elite so that the government's objectives have coincided with those of the elite. Even today, in many countries that exhibit the formal trappings of a modern democracy, that is regular elections, separation of powers and an ostensibly free press, de facto political power is not distributed uniformly across the populace but rather concentrated in an interwoven political and business elite. Older legal constraints on the extent of the franchise, such as the restriction of voting rights to the literate or the landowning, have been replaced to some extent by the advantages of deep pockets and privileged information so that, particularly in Latin America, de facto the elite has sway over important legislation and major bureaucratic and political appointments, as well as a large influence on the judiciary and the press.

In this paper, we develop a dynamic model to analyze the evolution of state capacity when the state serves the interest of an elite. We take a reduced-form approach to the sources of the de facto power of the elite. Rather than on the sources of its power, we focus on the *size of the elite*, that is, the fraction of the population whose interests are advocated by the state, and the *probability of renewal*, that is, the extent to which there is mobility in and out of the elite. We refer to a pair (size, probability of renewal) as a *constitution*. Of course, this is not a constitution in the legal sense but rather a larger set of economic and political institutions. For instance, the size of the elite may be affected by the concentration of economic assets, by the lack of transparency in government decision-making, and by the low level of education of the majority, precluding public opinion from being more inclusive. The probability of renewal of the elite may be affected by the

feasibility of entry and exit in economic markets, by the extent of political competition, and by the frequency of arbitrary interventions that affect the identity of property owners without modifying the long-run concentration of property.[1]

In our model, the elite decides every period on the tax rate and the allocation of fiscal revenues to investment in state capacity, to rents or particularistic spending in favor the elite, and to the provision of public goods that favor everyone in society. Higher taxes allow the elite to dispose of more revenues but also increase the size of an illegal sector that evades taxation and that results in negative externalities (such as crime) both for the elite and ordinary citizens. Investing in state capacity costs fiscal resources in the present but discourages illegal activities in the future, allowing the elite to raise higher taxes or to reduce the negative impact of illegal activities on all citizens.

We first take the constitution as exogenously given and analyze the effect of the constitution on the steady state level of state capacity, tax rate, and size of the illegal sector. We show that, for an initially small size of the elite, as the size of the elite increases, the steady state level of state capacity increases and the tax rate and the size of the illegal sector decline. Intuitively, a larger elite internalizes to a larger degree the burden imposed on society by the illegal sector and by elite rents. If the size of the elite becomes large enough, the tax rate increases again as it becomes convenient for the elite to provide universal public goods rather than enjoying particularistic spending. We call a *democracy* any constitution such that the size of the elite is large enough for the elite to provide universal public goods rather than enjoy rents.

We also show that, for an initially small size of the elite, as the probability of renewal of the elite declines, the steady state level of state capacity and the tax rate increase, and the size of the illegal sector declines. Intuitively, an elite with a lower probability of renewal is more patient and consequently more willing to invest in state capacity. We call an *oligarchy* any nondemocratic constitution such that the probability of renewal is zero, so that the same subset of the population enjoys rents every period.

Next, we allow for consensual changes in the constitution. Consensual changes are possible because any society such that is neither a democracy nor

[1] We can think of the reconstitution of an elite even as the identity of elite changed in Mexico after Revolution, in Bolivia after the agrarian reform in the 1950s, and in Peru after the period of leftist military dictatorship in the 1970s.

an oligarchy lies below the Pareto set. Intuitively, reducing the probability of renewal of the elite makes policy more forward looking, benefitting the elite and, when the elite is small enough, even ordinary citizens. Thus, for an initially small size of the elite citizens may in fact consent to the perpetuation of the same elite. In the opposite extreme, for an initially large size of the elite, if the probability of renewal is large enough the elite may consent to a transition to democracy. While starting with a positive probability of renewal of the elite induces inefficient policies when the government serves the elite, it may be convenient for ordinary citizens since it helps obtaining consensus for democratization.

Our formal model predicts that, if consensual constitutional changes are possible, then societies will split into oligarchies and democracies, with oligarchies providing more particularistic spending in favor of the elite and democracies providing more universal goods. Oligarchies will have smaller state capacity, higher tax rates on a smaller tax base, and a larger illegal sector than democracies. Depending on the initial allocation of agenda-setting power, societies with otherwise similar initial conditions may end up with widely different constitutions and policies.

Our work is related to several strands of literature, including classical public choice and modern political economy. In the public choice tradition, Mancur Olson (Olson 1993, McGuire and Olson 1996) has put emphasis both on the importance of a long horizon for benevolent autocratic rule and on the fact that a ruling minority with encompassing enough economic interests may choose welfare-maximizing policies. We provide an explicit dynamic model incorporating these two intuitions.

In the modern political economy literature, Besley and Persson (2009, 2010) have introduced state capacity as a choice variable in a two-period model in which two groups may alternate in power. In a similar bent, Acemoglu (2005) and Acemoglu et al. (2010) study the persistence of inefficient institutions to the benefit of a ruler, or as a result of an electoral equilibrium. Like Acemoglu and coauthors, and unlike Besley and Persson, we work on an infinite-horizon model, and unlike both we allow for changes both in the size of the ruling group and in the probability of renewal, and study the issue of endogenous constitutional changes.

Acemoglu and Robinson (2008) develop a model in which an elite holds some de facto power even under democratic institutions, and may invest in increasing this power, thus incurring in inefficiencies. Our focus is different as we are interested in the effects of elite rule on investment in state capacity.

Formal models of democratization have been proposed by Acemoglu and Robinson (2000, 2006) and by Lizzeri and Persico (2004), inter alia. Acemoglu and Robinson explain the expansion of the franchise as a result of strategic decisions by the elite under the threat of unrest and revolution when repression becomes too costly. Our model of democratization is more in line with Lizzeri and Persico, who show that democratization may occur even in the absence of a revolutionary threat since expanding the franchise turns away politicians from particularistic spending and toward programs with diffuse benefits. When the initial size of the elite is small, we offer a somewhat opposite result, that is, a majority of citizens may consent to a transition to an unchanging oligarchy. Further afield, Bueno de Mesquita et al. (2003) offer a political theory of government persistence and change that includes autocracy and democracy as special cases.[2]

The remainder of the paper is organized as follows. Section 2 lays down the basics of the model, including the definitions of strategies and equilibrium. Section 3 derives the (unique) equilibrium of the model. Section 4 explores the policy implications of different constitutions, and its impact on the steady state level of state capacity, taxation and the size of the illegal sector. Section 5 deals with consensual constitutional changes. Section 6 gathers some concluding remarks.

2 The model

We consider a society with a continuum of citizens. Citizens live infinite periods, $t = 1, 2 \ldots$. Citizens consume every period a private good and a public good as described below. There is an elite conformed by a fraction γ of the citizens. At the beginning of each period a member of the elite is randomly selected to choose the public policy for the period, which consists of the tax rate τ_t, spending in the public good g_t, and the investment in state capacity s_t.

After the public policy has been chosen, each citizen i, including elite members, receives an idiosyncratic random shock ϵ_{it} with a uniform distri-

[2]Rule by an elite and its impact on the organization of the state has been, of course, a fascinating subject for social science beyond economics for a long time, and it brings to mind in particular the early work of the so-called Italian school of elitists, that is Michels (1915), Mosca (1923), and, as sociologist, Pareto (1916). For recent related work on the difficulties inherent in democratic decision-making see Konrad and Skaperdas (2019).

bution on the interval $[0,1]$. The idiosyncratic shocks are independently distributed across time and individuals, so that each period the aggregate distribution of shocks is uniform. After learning the shock, each citizen decides whether to work in the *legal sector* or the *illegal sector* of the economy. Each citizen in the legal sector receives a net income of $1-\tau_t$ in units of the private good, while each citizen in the illegal sector receives a net income of $d+1-p_t-\epsilon_{it}$, where $d+1>1$ is the size of the market for the illegal sector, ϵ_{it} is the citizen's idiosyncratic cost of engaging in illegal activities, and p_t is the level of state capacity. State capacity depends on public investment in the previous period, except in period 1, where it is some $p_1 \in \Re_+$. State capacity acts as a deterrence to engage in illegal activities.

We denote by x_t the fraction of the population who works in the legal sector. Taxes are collected only on the legal sector so that total tax collection is equal to $\tau_t(1-x_t)$. We say that a policy plan is feasible if it satisfies the government budget constraint

$$\tau_t(1-x_t) \geq s_t + g_t.$$

Given a feasible policy plan, the elite appropriates aggregate rents $\tau_t(1-x_t)-s_t-g_t \geq 0$. Elite rents are equally split among elite members, so that each elite member receives rents equal to

$$(1/\gamma)(\tau_t(1-x_t)-g_t-s_t).$$

If a policy plan is not feasible, we assume that elite rents are zero, and spending on the public good and, if necessary, investment in state capacity are adjusted down until the government budget constraint is satisfied. Since the elite can anticipate the labor decisions of citizens, there is no reason for the elite to propose an unfeasible plan. To save on notation, we assume hereafter that the elite proposes a feasible plan.

All citizens receive a negative externality from the illegal sector equal to $L(x_t)$ measured in units of the private good, where L is a strictly increasing function and x_t is the fraction of citizens who work in the illegal sector. All citizens obtain a payoff from public goods equivalent to g_t/μ units of the private good, where $\mu \in (0,1)$.

At the end of the period, a fraction $1-\delta \in [0,1)$ of the elite is replaced by randomly drawn ordinary citizens, with each elite member being equally likely to be replaced. State capacity in period $t+1$ is determined

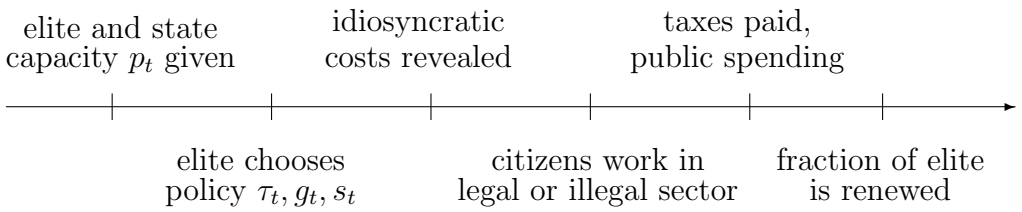


Figure 1: Within-Period Timeline

by $p_{t+1} = f(s_t)$, where f is a strictly increasing, concave function. That is, state capacity depreciates completely every period.

Summarizing, each period starts with state capacity p_t and an elite of size γ inherited from the previous period. At the beginning of the period, a random elite member chooses the period tax rate τ_t, public good level g_t and investment in state capacity s_t. Citizens discover their idiosyncratic costs of working in the illegal sector and decide whether to work in the legal or illegal sector. Citizens in the legal sector pay taxes, an amount g_t is spent in public goods, an amount s_t is spent in state capacity for next period, and any rents left are split among elite members. At the end of the period, a fraction $1 - \delta \in (0, 1)$ of the elite is renewed. Figure 1 shows the time line in any given period t.

Some comments about our assumptions are in order. The assumption that state capacity depreciates completely every period is made for simplicity and is clearly restrictive. Some forms of state capacity do depreciate very quickly. For instance, in modern states besieged by drug lords who can field private armies, keeping territorial control for the state takes constant political will and a permanent effort to keep effective security forces. Other forms of state capacity, however, take time to build up and depreciate more slowly; an example is the organization of a properly working judiciary and more generally the ability of the state to enforce contracts.[3] We go back to this issue in the concluding remarks.

The assumption that the policy plan is chosen before idiosyncratic costs are revealed is without loss of generality as long as idiosyncratic shocks are

[3]See e.g. Quintin (2008).

independent over time, because (as shown below) the current state capacity is the only policy variable that has a different effect on the payoff of elite members depending on whether they work in the legal or illegal sector. If idiosyncratic shocks are persistent, though, there may be conflicts of interest among the elite. Some members of the elite may anticipate working in the illegal sector, opening the possibility that government policy is in fact favorable to the illegal sector. We are sidestepping this issue to avoid dealing with intra-elite bargaining, but note that it may be an appropriate issue in the context of discussing rogue states.

The assumption that the public good has a linear payoff is also made for simplicity, with the parameter μ playing the convenient role of indexing the citizens' willingness to pay for the public good. If we assume instead that the payoff of the public good is concave in spending, the role of a increases or a decrease in μ would be played by an upward or downward shift in the payoff derived from the public good. The analysis would be more complex, as even a small elite would be willing to provide some public goods, but it would still be true that the size of the elite determines the allocation of fiscal revenues to either rents for the elite or universal public goods. Again, we discuss further this issue in the concluding remarks.

Each citizen's discounted utility at any time t is given by the discounted sum of period utilities

$$U_{it} = \sum_{t'=t}^{\infty} \beta^{t'-t} u_{it'},$$

with a discount factor $\beta \in (0,1)$ equal for all citizens. Period t utility of a citizen is linear in the citizen's consumption of the private good that period. From the preceding, the period t utility of an elite member who decide to work in the legal sector is equal to

$$u_{it} = 1 - \tau_t + g_t/\mu - L(x_t) + (1/\gamma)(\tau_t(1 - x_t) - g_t - s_t),$$

and the period t utility of an elite member who decide to work in the illegal sector is equal to

$$u_{it} = d + 1 - p_t - \epsilon_{it} + g_t/\mu - L(x_t) + (1/\gamma)(\tau_t(1 - x_t) - g_t - s_t),$$

where ϵ_{it} is the citizen's idiosyncratic cost of illegal activities. Similarly, the period t utility of an ordinary citizen (ie a non elite member) who decide to work in the legal sector is equal to

$$u_{it} = 1 - \tau_t + g_t/\mu - L(x_t)$$

and the period t utility of an ordinary citizen who decide to work in the illegal sector is equal to

$$u_{it} = d + 1 - p_t - \epsilon_{it} + g_t/\mu - L(x_t).$$

For simplicity we assume

$$L(x) = x^2/2 + \lambda x,$$

so that it is bad for aggregate welfare to have an illegal sector and $\lambda > 0$ indicates how bad is the aggregate effect of the illegal sector. We also assume

$$f^{-1}(p) = cp^2/2,$$

where $c > 0$.

We denote by $h_0 = p_1$ the history of play before time 1. The public history of play before time t for any other period is defined recursively as

$$h_{t-1} = (h_{t-2}, \tau_{t-1}, g_{t-1}, s_{t-1}, x_{t-1}) \in H_{t-2} \times [0,1] \times \Re_+ \times \Re_+ \times [0,1],$$

where H_t denote the set of possible histories at time t.

We define $e_{it} \in \{0,1\}$ taking the value 1 if citizen i is in the elite at time t and the value 0 if not. A (public, pure) *strategy* σ is a sequence

$$(\sigma_t)_{t=1}^{\infty} = ((T_t(h_{t-1}), G_t(h_{t-1}), S_t(h_{t-1}), X_t(h_{t-1}, \tau_t, g_t, s_t, e_{it}, \epsilon_{it})))_{t=1}^{\infty},$$

where

$$T_t : H_{t-1} \to [0,1], \quad G_t : H_{t-1} \to \Re_+, \quad \text{and} \quad S_t : H_{t-1} \to \Re_+$$

are (measurable) functions representing the choice of tax rate, public goods and state capacity investment after any possible history by a citizen adopting strategy σ if the citizen is part of the elite at time t and is selected to choose the policy that period, and

$$X_t : H_{t-1} \times [0,1] \times \Re_+ \times \Re_+ \times \{0,1\} \times [0,1] \to \{\text{legal}, \text{illegal}\}$$

is a (measurable) function representing the citizen job choice after any possible history, policy adopted that period, status of the citizen that period (ordinary citizen or elite), and realization of the idiosyncratic shock. Let Σ denote the set of strategies.

We say that the strategy σ is a (symmetric) *subgame perfect equilibrium* if

(i) every period t, after every possible history h_{t-1}, the strategy σ is a best-response for the elite's selected policymaker to everyone else adopting the strategy σ from then on, and

(ii) every period t, after every possible history h_{t-1}, every possible policy choice τ_t, g_t, s_t, and every realization of the random shock ϵ_{it}, the strategy σ is a best-response for each citizen i to every other citizen adopting the strategy σ from then on.

Note that at the beginning of any time t the payoff-relevant public information from past history can be summarized by the level of state capacity p_t. A *Markov strategy* is a tuple (T, G, S, X) where

$$T : \Re_+ \to [0,1], \quad G : \Re_+ \to \Re_+, \quad \text{and} \quad S : \Re_+ \to \Re_+$$

are (measurable) functions representing the choice of tax rate, public good provision and investment in state capacity as a function of the current level of state capacity p_t, and

$$X : \Re_+ \times [0,1] \times \Re_+ \times \Re_+ \times \{0,1\} \times [0,1] \to \{\text{legal}, \text{illegal}\}$$

is a (measurable) function representing the citizen job choice as a function of the state capacity p_t, policy adopted τ_t, g_t, s_t, status of the citizen e_{it}, and realization of the idiosyncratic shock ϵ_{it}. A *Markov perfect equilibrium* is a Markov strategy (T, G, S, X) such that the strategy induced by (T, G, S, X) is a subgame perfect equilibrium.

3 Endogenous tax policy and state capacity

In this section we describe the (unique) Markov perfect equilibrium of the model.

Best-response job choices require

$$X(p_t, \tau_t, g_t, s_t, e_{it}, \epsilon_{it}) = \begin{cases} \text{legal} & \text{if } \epsilon_{it} > d - p_t + \tau_t \\ \text{illegal} & \text{if } \epsilon_{it} < d - p_t + \tau_t \end{cases}, \tag{1}$$

with either job choice being a best-response if $\epsilon_{it} = d - p_t + \tau_t$. Thus, from the uniform distribution of idiosyncratic shocks, we get that along the equilibrium path a fraction

$$x_t = x[p_t, \tau_t] = \min\left\{\max\left\{\tau_t + d - p_t, 0\right\}, 1\right\}$$

of the population engage in illegal activities.

The expected utility of elite members after policy has been chosen and before learning their idiosyncratic shock can be written as

$$v(p_t, \tau_t, g_t, s_t) = \int_{\epsilon_{it}=0}^{x[p_t,\tau_t]} (d + 1 - p_t - \epsilon_{it})\, d\epsilon_{it} + (1 - x[p_t, \tau_t])(1 - \tau_t) \\ + g_t/\mu - \left(x[p_t, \tau_t]^2/2 + \lambda x[p_t, \tau_t]\right) + (1/\gamma)(\tau_t(1 - x[p_t, \tau_t]) - g_t - s_t).$$

Note that the first and second terms represent expected labor income in the illegal and legal sector, respectively. Solving the integral and using $d+1-p_t = x[p_t, \tau_t] + 1 - \tau_t$ for $x[p_t, \tau_t] \in (0, 1)$, the above expression simplifies to

$$v(p_t, \tau_t, g_t, s_t) = 1 - \tau_t + g_t/\mu - \lambda x[p_t, \tau_t] + (1/\gamma)(\tau_t(1 - x[p_t, \tau_t]) - g_t - s_t)$$

if $x[p_t, \tau_t] \in [0, 1)$ and $v(p_t, \tau_t, g_t, s_t) = 1 + d - p_t - \lambda$ if $x[p_t, \tau_t] = 1$. Similarly, the expected utility of ordinary citizens after policy has been chosen and before learning their idiosyncratic shock is

$$w(p_t, \tau_t, g_t, s_t) = 1 - \tau_t + g_t/\mu - \lambda x[p_t, \tau_t]$$

if $x[p_t, \tau_t] \in [0, 1)$ and $w(p_t, \tau_t, g_t, s_t) = 1 + d - p_t - \lambda$ if $x[p_t, \tau_t] = 1$.[4] Note that the aggregate net gains of working in the illegal sector are wiped out by the externality, so that even though it may make sense for some elite and ordinary citizens to join in the illegal sector after discovering their idiosyncratic shock, the existence of the illegal sector is bad for all citizens in expected terms.

For analytical convenience, in describing the problem of the elite we take as state variable the previous period's investment in state capacity; we define $y_t = s_{t-1}$ for $t = 2, \ldots$ and $y_1 = f^{-1}(p_1)$. The problem of the elite member deciding the tax rate and public spending can be represented by the Bellman equation

$$V(y_t) = \sup_{\substack{\tau_t \in [0,1] \\ g_t \in \Re_+, y_{t+1} \in \Re_+}} \left\{ v(p_t, \tau_t, g_t, y_{t+1}) + \beta \left(\delta V(y_{t+1}) + (1 - \delta) W(y_{t+1}) \right) \right\},$$

subject to

$$\tau_t(1 - x[f(y_t), \tau_t]) - g_t - y_{t+1} \geq 0,$$

[4] The functions v and w are continuous in the space and policy variables, in the case of v under the constraint that elite rents are nonnegative.

where $V(y_t)$ is the value of being in the elite and

$$W(y_t) = w(p_t, \tau_t, g_t, y_{t+1}) + \beta \left(\frac{(1-\delta)\gamma}{1-\gamma} V(y_{t+1}) + \left(1 - \frac{(1-\delta)\gamma}{1-\gamma} \right) W(y_{t+1}) \right)$$

is the value of being an ordinary citizen.

We assume

$$(A1) \qquad c > (3+\sqrt{5})/4, \quad \lambda \geq 1, \quad \text{and} \quad d < 1,$$

so that the solution of the elite problem is interior. In particular, the lower bound on the externality guarantees that the problem of the elite is concave in the policy variables. The lower bound on the marginal cost of state capacity guarantees that it is too costly for the elite to eliminate the illegal sector completely, and the upper bound on the size of the market for the illegal sector guarantees that the elite chooses policies such that the illegal sector is smaller than the economy.

Note that the constraint in the maximization problem is that aggregate elite rents are nonnegative. From the first-order condition associated to the level of public spending we get that if $\gamma < \mu$, then public good provision must be zero but aggregate rents can be positive, and if $\gamma > \mu$, then aggregate rents must be zero but the public good may be provided. That is, a small enough elite will favor particularistic spending, while a larger elite will provide universal public goods.

Suppose $0 < x[f(y_t), \tau_t] < 1$ and either the public good is provided or the elite collects rents, so that the fiscal constraint is not binding, for $t = 1, 2 \ldots$. From the first-order condition associated to the tax rate we get $\tau_t = T(f(y_t))$ where

$$(2) \qquad T(p_t) = \min \left\{ \tfrac{1}{2}(1 - d + p_t - (\lambda + 1) \min\{\gamma, \mu\}), 1 \right\}.$$

Since either the public good is provided or the elite collects rents, we get $g_t = G[y_t, y_{t+1}]$ where

$$G[y_t, y_{t+1}] = I[\gamma, \mu](T(f(y_t))(1 - x[f(y_t), T(f(y_t))]) - y_{t+1}),$$

where[5]

$$I[\gamma, \mu] = 0 \text{ if } \gamma < \mu \text{ and } I[\gamma, \mu] = 1 \text{ if } \gamma \geq \mu.$$

[5]If $\gamma = \mu$ there are multiple equilibria. In equilibrium, $I[\gamma, \mu]$ can be equal to any constant between zero and one, or indeed, equal to any function of y_t bounded between zero and one that preserves concavity of the elite problem described below. Setting $I[\gamma, \mu] = 1$ if $\gamma = \mu$ helps simplify the exposition.

Substituting $G[y_t, y_{t+1}]$ for g_t and $T(f(y_t))$ for τ_t in $V(y_t)$ and $W(y_t)$, we have

$$\begin{aligned} V(y_t) = \sup_{y_{t+1}\in\Re_+} \{(T(f(y_t))(1 - x[f(y_t), T(f(y_t))]) - y_{t+1})/\min\{\gamma,\mu\} \\ +1 - T(f(y_t)) - \lambda x[f(y_t), T(f(y_t))] \\ +\beta\delta V(y_{t+1}) + \beta(1-\delta)W(y_{t+1})\}, \end{aligned}$$

where

$$\begin{aligned} W(y_t) = 1 - T(f(y_t)) + G[y_t, y_{t+1}]/\mu - \lambda x[f(y_t), T(f(y_t))] \\ + \beta(1-\delta)(\gamma/(1-\gamma))V(y_{t+1}) + \beta(1-(1-\delta)(\gamma/(1-\gamma)))W(y_{t+1}). \end{aligned}$$

Note that the instantaneous payoff of the elite and that of ordinary citizens are bounded, continuously differentiable and concave if $\lambda \geq 1$, which follows from assumption A1. Thus, by standard arguments, $V(\cdot)$ and $W(\cdot)$ are concave and continuously differentiable. From the first-order condition associated to state capacity

$$1/\min\{\gamma,\mu\} = \beta\delta V'(y_{t+1}) + \beta(1-\delta)W'(y_{t+1}).$$

Using the envelope condition we get

$$1/\min\{\gamma,\mu\} = \beta(\hat{\delta}\tau_{t+1}/\min\{\gamma,\mu\} + \lambda)f'(y_{t+1}),$$

where $\hat{\delta} = \delta + (1-\delta)I(\gamma,\mu)$. Equivalently,

$$p_{t+1} = (\beta/c)(\hat{\delta}\tau_{t+1} + \lambda\min\{\gamma,\mu\}).$$

From the previous equation and equation 2 we get that $p_{t+1} = p^*$, where

$$p^* = (\beta/c)((\hat{\delta}/2)(1 - d + p^* - (\lambda+1)\min\{\gamma,\mu\}) + \lambda\min\{\gamma,\mu\}).$$

Collecting terms in p^* and in $\min\{\gamma,\mu\}$,

$$(1 - \beta\hat{\delta}/2c)p^* = (\beta\hat{\delta}/2c)(1-d) + ((\beta/c)\lambda - (\beta\hat{\delta}/2c)(\lambda+1))\min\{\gamma,\mu\},$$

or equivalently

$$p^* = \frac{\beta\hat{\delta}/c}{2 - \beta\hat{\delta}/c}(1 - d + (2\lambda/\hat{\delta} - \lambda - 1)\min\{\gamma,\mu\}).$$

Thus, investment in state capacity each period is given by

$$S(p_t) = cp^{*2}/2. \tag{3}$$

Note that investment in state capacity is independent of the current level of state capacity. Finally, we have

$$G(p_t) = I[\gamma, \mu](T(p_t)(1 - x[p_t, T(p_t)]) - cp^{*2}/2). \tag{4}$$

Since investment in state capacity is constant, the dynamics of policy and job choices along the equilibrium path is very simple under the rules described by equations 1, 2, 3 and 4. From equation 3 we get that for any $t > 1$, $p_t = p^*$. From this and equation 2, we get that for any $t > 1$, $\tau_t = \tau^*$ where

$$\tau^* = T(p^*) = \frac{1}{2}\left(1 - d - (\lambda + 1)\min\{\gamma, \mu\}\right) + \frac{1}{2}\left(\frac{\beta\hat{\delta}/c}{2 - \beta\hat{\delta}/c}\right)\left(1 - d + (2\lambda/\hat{\delta} - \lambda - 1)\min\{\gamma, \mu\}\right).$$

Collecting terms and simplifying,

$$\tau^* = \frac{1 - d - (\lambda + 1 - \beta\lambda/c)\min\{\gamma, \mu\}}{2 - \beta\hat{\delta}/c}.$$

Finally, using the previous expressions we get that for any $t > 1$, $x_t = x^*$ where

$$x^* = x[p^*, \tau^*] = 1 - \frac{1 - d + (\beta\lambda/c + (1 - \beta\hat{\delta}/c)(\lambda + 1))\min\{\gamma, \mu\}}{2 - \beta\hat{\delta}/c}.$$

We have

Theorem 1 *There is a $\overline{\mu} \in (0, 1/2)$ such that for every $\mu \in [0, \overline{\mu})$ there is a Markov perfect equilibrium and it is unique for every $\gamma \neq \mu$. Equilibrium job choices and policy choices are given by equations 1, 2, 3 and 4. Along the equilibrium path, the tax policy, state capacity and size of the illegal sector converge to τ^*, p^*, and x^*, respectively, for any initial condition $p_1 \geq 0$.*

Proof. From the previous discussion we know that job choices given by equation 1 are optimal. We also know that policy choices given by equations 2, 3 and 4 are optimal for the elite, if the implied tax rate, illegal sector size and state capacity are interior, and the elite either collects positive rents or provides the public good. In the Appendix we show that for some $\overline{\mu} \in (0, 1/2)$ this is the case for every $p_t \geq 0$ for every $\mu < \overline{\mu}$. ■

Recall that the payoff of the public good is equal to the inverse of μ. The upper bound $\overline{\mu}$ implies that providing some of the public good is more attractive for a large enough elite than dedicating all tax revenues to building up state capability. For a small elite appropriating rents is even more attractive than providing the public good, so the upper bound guarantees that the fiscal constraint in the problem of the elite is not binding in either case.

4 Constitution and state capacity

In this section we discuss the relationship between the endogenous variables (state capacity, tax policy and size of the illegal sector) and the society's constitution (size of the elite and probability of renewal) in equilibrium.

From direct inspection of equations 2, 3 and 4 it follows that the policies adopted by any society with $\gamma \geq \mu$ are identical to those chosen by a society with $\gamma = 1$; that is, the elite collects no rents, fully internalize the externality imposed on society by the illegal sector, and dedicates all fiscal revenues to providing universal public goods and building up state capacity. We refer to any such society as a *democracy* as it equalizes the payoffs of elite and ordinary citizens.

On a somewhat opposite end, consider a society with $\gamma < \mu$ and $\delta = 1$. In any such society, the elite remains the same in every period and moreover the payoffs of the elite are larger than those of ordinary citizens. We refer to any such society as an *oligarchy*. Note from previous definitions that a society may be neither a democracy nor an oligarchy. Both the case of democracy and the case of oligarchy play an important role in what follows.

The following result is immediate.

Corollary 1 *If a society is a democracy, then the steady state level of taxes, state capacity and size of the illegal sector are constant in the probability of renewal of the elite and the size of the elite.*

Recall that the probability of renewal of the elite is $1-\delta$. We have

Corollary 2 *If a society is not a democracy, then the steady state levels of taxes and state capacity are decreasing in the probability of renewal of the elite, and the steady state size of the illegal sector is increasing in the probability of renewal of the elite.*

Proof. From the definitions of τ^*, p^*, and x^* it is simple to show that if $\gamma < \mu$ then $\partial\tau^*/\partial\delta > 0$ and $\partial p^*/\partial\delta > 0$, and

$$\partial x^*/\partial\delta < 0 \quad \text{if} \quad \gamma < (1-d)/(1+\gamma(1-\beta/c)),$$

but

$$\gamma < \mu < \overline{\mu} \leq (1-d)/(1+\gamma) \leq (1-d)/(1+\gamma(1-\beta/c)).$$

(See the Appendix for the upper bound on $\overline{\mu}$.) ■

Intuitively, as the probability of renewal of the elite increases, the allure of future rents is less important for the elite, and the elite correspondingly invests less in state capacity. As a result, in steady state the elite is less capable to collect taxes. With respect to the illegal sector, the decrease in state capacity more than compensates the tax reduction, leading to an increase in illegal activities. That is, political alternation in the sense of renewal of a small enough elite results in shrinking of the state and its ability to contain the illegal sector.

It is interesting to consider the temporal trajectory of the policy variables in reaction to an unanticipated increase of the probability of renewal of the elite at the beginning of period t. Since state capacity is given at time t, from equation 2 we get that the there is no contemporary change in taxation. However, because of the larger probability of renewal by the beginning of period $t+1$, there will be a smaller investment in state capacity at time t for any expected tax rate in $t+1$. This, again from equation 2, leads to a reduced tax rate in period $t+1$. Finally, because of the probability of renewal by the beginning of time $t+2$, investment in state capacity will be the same in period $t+1$ than in period t. That is, the policy adjustment occurs in periods t and $t+1$ in reaction to expectations about changes in the composition of the elite in periods $t+1$ and $t+2$. Note that a two-period model, while simpler, would not be completely satisfactory to analyze the effects of a permanent increase in elite turnover.

Similarly, we have

Corollary 3 *If a society is not a democracy, then the steady state level of taxes is decreasing, the steady state level of state capacity in increasing, and the illegal sector is decreasing in the size of the elite. If the society is not an oligarchy, then as the size of the elite increases, at $\gamma = \mu$ the steady state level of taxes and state capacity jump discontinuously upward, and the steady state size of the illegal sector jumps discontinuously downward.*

Proof. From the definitions of τ^*, p^*, and x^* it is simple to show that if $\gamma < \mu$ then $\partial\tau^*/\partial\gamma < 0$, $\partial p^*/\partial\gamma > 0$, and $\partial x^*/\partial\gamma < 0$.

If γ converges to μ from below, then the steady state tax rate converges to

$$\frac{1 - d - (\lambda + 1 - \beta\lambda/c)\mu}{2 - \beta\delta/c},$$

while for any $\gamma \geq \mu$, the steady state tax rate is equal to

$$\frac{1 - d - (\lambda + 1 - \beta\lambda/c)\mu}{2 - \beta/c},$$

which is strictly above the previous limit since $\delta < 1$. Similar arguments apply to the steady state level of state capacity and size of the illegal sector; in this last case we need to use the upper bound on μ as in the proof of the previous corollary. ■

Intuitively, as the size of the elite increases, per capita rents for elite members decline so the utility maximizing tax rate declines accordingly. When the size of the elite crosses the threshold $\gamma = \mu$, the marginal incentive for collecting taxes is no longer providing rents to the elite but rather providing universal public goods, which benefit current elite members regardless of whether they remain or not in the elite in the future. Thus, if the probability of exiting the elite is not equal to zero, the level of taxes must jump upwards.

Similarly, as the size of the elite increases, elite members internalize to a larger degree the negative externality imposed on every citizen by the illegal sector, so state capacity increases accordingly. When the size of the elite crosses the threshold $\gamma = \mu$, elite members care about the positive effect of state protection on taxation regardless of whether they stay in the elite or not next period, since for $\gamma > \mu$ fiscal revenue is devoted to providing universal public goods and not rents for the elite. Accordingly, if the probability of exiting the elite is not equal to zero, the level of state capacity must jump upwards.

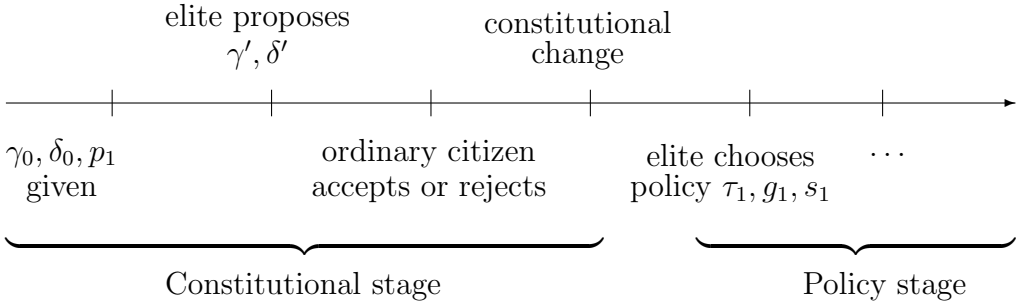
Finally, since initially taxes decrease and state capacity increases as the size of the elite increases, the size of the illegal sector must decrease. When the size of the elite crosses the threshold $\gamma = \mu$, the jump upwards in the level of state capacity more than compensates the jump upwards in the level of taxation, since the reason to collect more taxes is both to provide public goods and to reduce the size of the illegal sector.

Again, it is interesting to consider the temporal trajectory of the policy variables in reaction to an unanticipated increase of the size of the elite at the beginning of period t. Even though state capacity is given at time t, from equation 2 we get that the there is a drop of the tax rate in period t because elite rents become less attractive as they have to be split among a larger elite in period t. Moreover, because elite rents are expected to remain less attractive in period $t+1$, there will be a smaller investment in state capacity at time t for any expected tax rate in $t+1$. This, again from equation 2, leads to a reduced tax rate in period $t+1$. Finally, because elite rents are expected to remain less attractive in period $t+2$, investment in state capacity will be the same in period $t+1$ than in period t. The policy adjustment occurs in periods t and $t+1$, in reaction to the change in the size of the elite in period t and the expectations about periods $t+1$ and $t+2$.

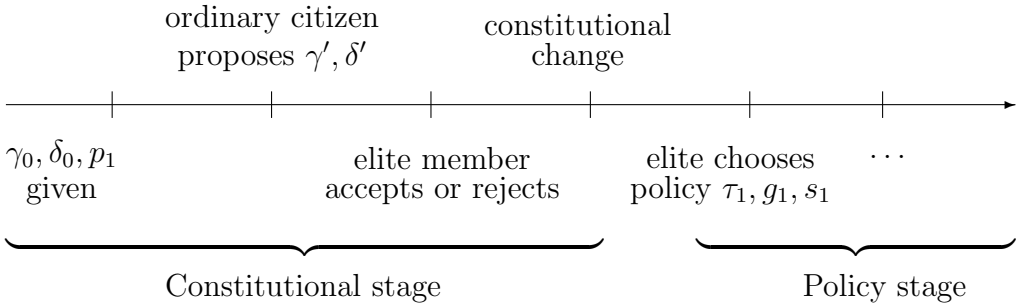
5 Endogenous constitutions

In this section we modify the game to allow for consensual changes in the political and social institutions behind the size of the elite and the probability of renewal. In particular, we introduce a constitutional decision at the beginning of the first period, before a random elite member chooses the public policy for the period. Play within period 1 can be split into a constitutional decision stage, as described below, and a policy decision stage, as described in previous sections. Play any other period occurs exactly as it was described in previous sections.

At the beginning of period 1 there is an initial elite size γ_0 and probability of renewal δ_0. We consider two cases representing extreme allocations of bargaining power. In the first case, the elite sets the agenda. In particular, a random elite member makes a constitutional proposal γ', δ', and a random ordinary citizen accepts or rejects the proposal. In the second case, ordinary citizens set the agenda. In particular, a random ordinary citizen makes a constitutional proposal γ', δ', and a random elite member accepts or rejects



(a) The elite sets the agenda



(b) Ordinary citizens set the agenda

Figure 2: Modified Within-Period 1 Timeline

the proposal. In either case, if the proposal is accepted, it is adopted immediately. That is, if $\gamma' \neq \gamma_0$, then the elite expands or contracts, selecting random ordinary citizens or random elite members. Similarly, if $\delta' \neq \delta_0$, the probability of renewal by the end of the period changes accordingly. If instead the proposal is rejected, initial institutions remain in place so that $\gamma = \gamma_0$ and $\delta = \delta_0$. We refer to the citizen who makes the proposal as the agenda-setting citizen, and to the citizen who accepts or rejects as the citizen with veto-power. The remainder of within period play remains as it was described in section 2. After period 1, the constitution remains fixed for the foreseeable future.

Now the state variables every period after period 1 include not only the

level of state capacity but also the political institutions, γ, δ, inherited from period 1. Figure 2 illustrates the time line in period 1 in the modified game.

We say that a constitutional change is policy-relevant if it affects the subsequent policy decisions. From previous sections, if a society is a democracy, then any constitutional change in the probability of renewal of the elite is policy-irrelevant, and so it is any change in the size of the elite as long as the elite remains above the bound μ.

It turns out that there is room for consensual, policy-relevant constitutional changes as long as the society is neither a democracy nor an oligarchy. Moreover, democracy and oligarchy are absorbing states.

Theorem 2 *If a society is a democracy or an oligarchy at the beginning of period* 1*, no policy-relevant constitutional change is accepted. If a society is neither a democracy nor an oligarchy at the beginning of period* 1*, then the agenda-setting citizen proposes either an oligarchy or a democracy, and the citizen with veto power accepts.*

We prove the theorem via a series of lemmas.

Lemma 1 *If $\delta_0 = 1$ or $\gamma_0 \geq \mu$, no policy-relevant constitutional change is accepted regardless of who sets the agenda.*

Proof. If $\delta_0 = 1$ then the value of the elite is continuous and weakly decreasing in the size of the elite, and strictly decreasing if $\gamma_0 < \mu$. Thus the elite will not accept any increase in the size of the elite if $\gamma_0 < \mu$, and any increase in the size of the elite if $\gamma_0 \geq \mu$ is irrelevant for policy decisions. If $\delta_0 = 1$ and $\gamma_0 < \mu$, any increase in the probability of renewal of the elite makes current elite members worse off, and if $\gamma_0 \geq \mu$ any increase in the probability of renewal of the elite is irrelevant for policy decisions. Finally, if $\gamma_0 \geq \mu$, any change in the size of the elite below μ will make ordinary citizens worse off, while any other change in the size of the elite is policy-irrelevant. ■

Lemma 2 *If $\delta_0 < 1$, $\gamma_0 < \mu$ and the elite sets the agenda, there is some $\hat{\gamma} \in (0, \mu]$ such that if $\gamma_0 < \hat{\gamma}$ then in the constitutional stage the elite member proposes $\delta' = 1$ and some $\gamma' \in [\gamma_0, \mu)$, and if $\gamma_0 \geq \hat{\gamma}$, then the elite member proposes $\gamma' \geq \mu$ and any δ'. In either case the proposal is accepted by the ordinary citizen.*

Proof. Suppose that the elite sets the agenda and $\delta_0 < 1$. Consider the case $\gamma_0 = 0$ i.e. the elite is very small. Increasing δ to one is obviously preferable for the current elite to the status quo. We claim it is also convenient for ordinary citizens. To see why, note that reducing the probability of renewal does not change the current period tax nor state capacity, so it does not change the current period instantaneous payoff to ordinary citizens. Next period tax and state capacity level will be set at the new steady state values. Since $\gamma_0 = 0$, the probability of becoming part of the elite is negligible for any ordinary citizen. Thus, ordinary citizens are better off if and only if their instantaneous payoff at the new steady state tax and state capacity is larger than it was. This is in fact the case if

$$-\partial\tau^*/\partial\delta - \lambda\partial x^*/\partial\delta > 0,$$

or equivalently

$$\lambda\partial p^*/\partial\delta > (1+\lambda)\partial\tau^*/\partial\delta,$$

which verifies as long as $\lambda > 1$ (assumption A1). It remains to show that the elite cannot be better off offering an increase in the elite size. This follows from the fact that if δ is set at one then the value of the elite is continuous and weakly decreasing in the size of the elite. From continuity of the value of being an ordinary citizen with respect to the size of the elite, it follows that if γ_0 is near zero then the elite will propose $\gamma' = \gamma_0$ and $\delta' = 1$, and the ordinary citizen will accept the proposal.

We sketch the remainder of the proof. For larger values of γ_0 it may be the case that ordinary citizens would be worse off accepting $\gamma' = \gamma_0$ and $\delta' = 1$. This is because reducing the probability of renewal of the elite has two effects. On the one hand, it increases the sum of the payoffs of the elite and ordinary citizens. On the other hand, it redistributes in favor of the current elite as it reduces mobility in and out of the elite. Thus, the elite may need to compensate ordinary citizens with a one-off increase in the size of the elite in exchange for reducing the probability of renewal of the elite in the future. For values of γ_0 close enough to μ, it may be that the increase in the size of the elite that compensates ordinary citizens for taking δ to one is larger than $\mu - \gamma_0$. In that case the best the elite can do is propose democracy. ■

Lemma 3 *If $\delta_0 < 1$, $\gamma_0 < \mu$ and ordinary citizens set the agenda, there is some $\overline{\gamma} \in [0, \mu)$ such that if $\gamma_0 > \overline{\gamma}$ then in the constitutional stage the ordinary citizen proposes any $\gamma' \geq \mu$ and any δ', and if $\gamma_0 \leq \overline{\gamma}$, then the ordinary citizen proposes $\delta' = 1$ and some $\gamma' \in [\gamma_0, \mu)$; in either case the proposal is accepted by the elite member.*

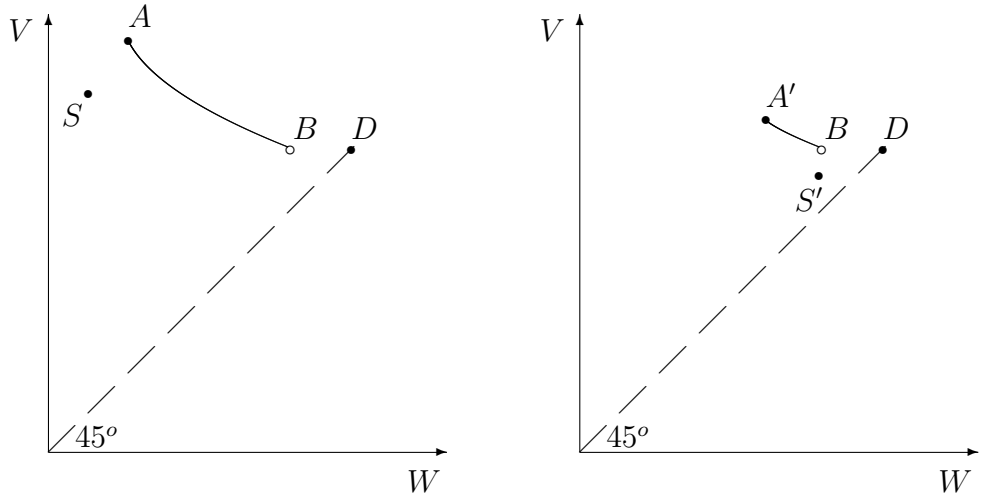
Proof. Suppose ordinary citizens set the agenda and $\delta_0 < 1$. Increasing γ above μ is obviously preferable for ordinary citizens to any other political institution, since elite rents are eliminated and instead public goods are optimally provided. We claim it is also convenient for the elite for large enough γ_0. To see why, note that for γ_0 close to μ the per capita return of elite rents is nearly equal to the payoff provided by public goods. By expanding the size of the elite so that public goods are provided instead of elite rents, current elite members obtain a larger payoff to the extent that there is some positive probability of elite renewal in the status quo.

We sketch the remainder of the proof. For smaller values of γ_0 it may be the case that the elite would be worse off accepting $\gamma' \geq \mu$. This is because increasing the size of the elite above the threshold μ has two effects. On the one hand, it increases the sum of the payoffs of the elite and ordinary citizens. On the other hand, it redistributes in favor of ordinary citizens as it replaces elite rents with universal public goods. Thus, ordinary citizens may be unable to obtain the consent of the elite to become a democracy. In that case, the best for ordinary citizens is to propose an oligarchy, which increases the sum of the payoffs, coupled with a one-off increase in the size of the elite so as to redistribute all the payoff gain to current ordinary citizens. ■

The first line of the statement of the theorem follows from Lemma 1, the second line from Lemmas 2 and 3.

Lemma 3 may seem surprising. Why would the elite extend the franchise so as to eliminate elite rents? The reason is that if there is some probability of renewal of the elite, current elite members also care about the payoff of ordinary citizens in the future. Increasing the franchise today is a way to commit to universal public goods in the future. This argument is similar to the one proposed by Lizzeri and Persico (2004) to explain the voluntary extension of the franchise in nineteen century Britain.

Lemma 2 may seem even more surprising. Why would ordinary citizens give their consent to the transition from a divided society with some mobility to an oligarchic regime with no mobility? The reason is that the elite becomes more forward looking and consequently more willing to spend in



(a) Voting for autocracy (b) Consensual democratization

Figure 3: The Constitutional Bargain

state capacity as the probability of renewal of the elite declines. If the size of the elite is very small so that mobility is negligible from the viewpoint of ordinary citizens to begin with, then ordinary citizens will be better off with a reduction in mobility without any further compensation. In effect, borrowing the title of Magaloni's (2006) work on the PRI rule in twenty century Mexico, it becomes convenient for the majority of citizens to "vote for autocracy."

Figure 3 (a) and (b) illustrates the bargaining problem faced by the elite and ordinary citizens when the initial elite size is small (near 0) and large (near μ), respectively, and when the probability of renewal of the elite is positive. In each case, the expected discounted utility of elite members is depicted in the vertical axis and the expected discounted utility of ordinary citizens is depicted in the horizontal axis. Point D over the 45 degree line represents the utilities of elite members and ordinary citizens in democracy.

In case (a), the status quo is given by the point S and the Pareto set is given by the curve AB (open in the point B) together with the point D. Point A represents the utilities for elite and ordinary citizens of taking the probability of renewal to zero while keeping the current elite size constant,

and it is the best point for the elite in the Pareto set. Successive increases in elite size take the utilities of elite members and ordinary citizens along the curve AB. The Pareto set is discontinuous at B since increasing the size of the elite from below μ to μ leads the elite to provide universal public goods rather than appropriating rents. While the elite is indifferent between providing public goods or appropriating rents when the size of the elite is μ, ordinary citizens are better off if public goods are provided. As argued in Lemma 2, when the size of the elite is near zero, ordinary citizens would be better off taking the probability of renewal to zero. Therefore, if the elite sets the agenda, the elite will propose point A and ordinary citizens will consent.

In case (b), the status quo is given by the point S' and the Pareto set is given by the curve $A'B$ (open in the point B) together with the point D. As argued in Lemma 3, for any fixed probability of renewal of the elite, there is a size of the elite so close to μ that the elite would be better off with democracy rather than with the status quo. Therefore, if ordinary citizens set the agenda, they will propose point D and the elite will consent.[6]

In synthesis, if the possibility of constitutional change is open, then efficient bargaining between the current elite and ordinary citizens leads either to a shut down of the possibility of renewal of the elite, or to an increase of the size of the elite to such an extent that belonging or not to the elite becomes irrelevant from the point of view of individual citizens' payoffs.

6 Final remarks

In this paper we adopt the view that state capacity is a choice variable and can increase over time, and that government decisions can be usefully modeled as serving the interests of a segment of the population or elite. We develop a dynamic model linking the evolution of state capacity to the size and renewal of the elite. We show that democratization in the sense of increases in the size of the elite leads in general to a larger investment in state capacity, with an associated reduction in illegal activities, including crime. Democratization has a potential non-monotonic effect on taxation. As larger segments of the population are enfranchised, the allure of particularistic spending declines, leading to lower taxes, but providing universal

[6]If there is a large probability of renewal and citizens are patient, S' can be arbitrarily close to the 45 degree line, but always below D, so that both the elite and ordinary citizens will propose democracy.

public goods becomes attractive, which may lead to higher taxes.

Turnover of the elite, without expanding the segment of the population whose interests are taken into account by the government, leads to a reduced investment in state capacity, with an associated increase in illegal activities. When consensual changes in the constitution are allowed, the society evolves either towards a democracy, with no distinction between the welfare of the elite and the rest of the population, or towards an entrenched oligarchy with no turnover of the elite.

The main insight of the model is that severe limitations in state capacity leading to a large and noxious illegal sector, such as the illegal drug industry in several Latin American countries, can be linked to an incomplete democratization. That is, political will to spend fiscal resources in building up the capacity of the state to deter illegal activities is lacking for the same reason that the political will to rein in private monopolies, captured regulators, and other sources of rents for the elite is lacking. Democratization in the sense of the extension of effective political rights will work in favor of the expansion of state capacity as it will work in favor of the provision of other, more conventional public goods.

Economic and political dynamics are kept simple in our model for several reasons. Most importantly, state capacity depreciates completely every period. As an example, containment of a powerful illegal drug industry requires a constant police and military effort in several Latin American countries. Another example is the wage bill for civil servants; caps in the wages for top civil servants may have a quick negative impact on the quality of government. As mentioned earlier, other forms of state capacity resemble more a stock of government infrastructure that can be manipulated through investment over time. In terms of better understanding politico-economic transitions, it may be interesting to explore the interaction between government investment in a slowly depreciating state capacity and citizens's investment in capital. Our comparative statics results about the steady state level of state capacity will hold in a suitable version of the model with slowly depreciating state capacity, as long as it is the case that during the adjustment to the steady state the elite maximizes fiscal revenue every period.

The implications of persistent state capacity for constitutional change are more complex. If there is only one opportunity for constitutional change, as assumed in section 5, then it will still be the case that ordinary citizens will propose the best constitution for them over the Pareto set, and similarly for elite members. The Pareto set, however, may depend on initial conditions.

In particular, if the constitutional change is anticipated, the elite may underinvest if it expects to set the agenda as it makes ordinary citizens more pliable to a transition to oligarchy. Conversely, an initially high level of state capacity may be beneficial for ordinary citizens as it reduces the advantage of the transition to oligarchy.[7]

Another important simplification is our assumption that the payoff of the public good is linear in spending in public goods. If we assume instead that the payoff of the public good is concave in spending, even a small elite may be willing to provide some public goods. However, as in the model developed here, there will be a size of the elite such that elite would prefer to devote all fiscal revenues to public good provision rather than appropriating any rents. The reason is that as the elite grows larger, it internalizes the externality imposed by the illegal sector, which reduces the incentive to tax solely for redistributive purposes. The analysis may become more complex, though, as a large enough elite may decide not to maximize fiscal revenues as in the current model if the marginal utility of the public good at the point where fiscal revenues are maximized falls below the marginal utility of private goods.

Finally, we contemplate only one constitutional period (period 1 in the modified model). If there are several opportunities to consensually alter the constitution, then the elite may set policies in anticipation of the period of constitutional change; for instance reducing state capacity to make ordinary citizens more pliable to a transition to oligarchy.[8] In addition (as opposed to Acemoglu and Robinson 2000, 2006), the elite is not allowed to invest in its survival rather than in state capacity, and neither the elite nor ordinary citizens can use force to alter the constitution.[9] Of course, if the threat of force is possible, neither oligarchy nor democracy need to be absorbing states. Relaxing these two assumptions may yield a more complex and potentially interesting constitutional dynamics.

[7]In a similar vein, it would be interesting to explore the effect of international trade on democratization. On the effect of international trade openness in a setting where there are militia or rebel groups, see Ghosh and Robertson (2010).

[8]In a similar spirit, Shen (2007) notes that a dictator may not implement policies that encourage citizens to invest even if the additional investment increases tax collection for the dictator, if the ensuing growth leads to an increased probability of a revolution in the future.

[9]The possibility of using force to alter the constitution is explored, for instance, by Benhabib and Przeworski (2006) in relation to redistribution under democracy.

Appendix

In this appendix we finish the proof of Theorem 1. It remains to be shown that the tax rate is interior, state capacity is nonnegative, the illegal sector size is interior, and either the public good is provided or the elite collects rents, so that the fiscal constraint is not binding, if the elite adopts the policies given by equations 2, 3 and 4 if μ is bounded above by some $\overline{\mu} \in (0, 1)$.

Note that $T(p_t) \leq 1$ for all p_t by definition, and moreover, $T(p^*) < 1$ if $c > \beta$, which is satisfied because of assumption A1. To establish that the tax rate is nonnegative it is enough to show $T(0) > 0$, which follows from $d < 1$ (assumption A1) if $\mu < (1-d)/(\lambda+1) < 1/2$. Next, state capacity is nonnegative if $\lambda \geq 1$, which is implied by assumption A1. Similarly, the size of the illegal sector is positive and smaller than one if $c \geq 1$, which is implied by assumption A1.

To verify that the elite either collects positive rents or provide the public good, consider period 1 in the worst case scenario, that is $p_1 = 0$. In that case total tax revenue is $(1/4)((1-d)^2 - (\lambda+1)^2 \min\{\gamma, \mu\}^2)$ and investment in state capacity is

$$\frac{c}{2}\left(\frac{\beta\delta/c}{2-\beta\delta/c}\right)^2 (1 - d + (2\lambda/\delta - \lambda - 1)\min\{\gamma, \mu\})^2.$$

Total tax revenue exceeds investment in state capacity for small enough μ if

$$2c\left(\frac{\beta\delta/c}{2-\beta\delta/c}\right)^2 < 1,$$

which is implied by $c > (3+\sqrt{5})/4$ (assumption A1).

The bound $\overline{\mu}$ is obtained by collecting the previous two upper bounds on μ.

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