The Origins of State Capacity: Property Rights, Taxation, and Politics*

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Abstract

Economists generally assume the existence of sufficient institutions to sustain a market economy and tax the citizens. However, this starting point cannot easily be taken for granted in many states, neither in history nor in the developing world of today. This paper develops a framework where "policy choices", regulation of markets and tax rates, are constrained by "economic institutions", which in turn reflect past investments in legal and fiscal state capacity. We study the economic and political derminants of these investments. The analysis shows that common interest public goods, such as fighting external wars, as well as political stability and inclusive political institutions, are conducive to building state capacity. Premilinary empirical evidence based on cross-country data find a number of correlations consistent with the theory.

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1 Introduction

Traditional economic theory presumes sufficient institutions to sustain a market economy and tax citizens. The Arrow-Debreu model implicitly assumes a government that flawlessly enforces contracts. Similarly, studies of optimal taxation explicitly acknowledge informational constraints, but implicitly assume a bureaucracy able and willing to enforce any tax policy respecting those constraints. The same is true for positive analyses in political economics of how the power to tax or regulate is chosen in a political equilibrium with collective choice. However, such a starting point cannot be taken for granted in many states around the world.

The standard approach in economics contrasts with the perspective on the origins of the state taken by historians, who see the evolution of state capacity in taxation and market-supporting institutions as a central fact to be explained. An intriguing argument by political historians (see, e.g., Tilly, 1990) holds that state capacity evolved historically over centuries in response to the exigencies of war. War placed a premium on sources of taxation and created incentives for governments to invest in institutions for the maintenance of trade and property rights.[1]

The historical link between the introduction/development of modern income tax systems and the onset or risk of war provides an interesting background to our work. For example, Britain first introduced an income tax in 1798 given the pressure on its public finances during the Napoleonic war, and the USA first introduced a form of income taxation in 1861 during the civil war and the Internal Revenue Service (IRS) was founded at the same time. Both countries significantly extended their income tax systems during the first and second world wars; in Britain, e.g., the pay-as-you-earn method of tax collection was introduced in 1944. In Sweden, a system of relatively uniform permanent taxation of land and temporary taxation of wealth goes back as far as the 13th century. Sweden first introduced a general income tax in 1861 and an expanded progressive income tax in 1903, in both cases with the motive to increase military expenditures. Our analysis suggests that the significance of war in state capacity building comes from the fact that it is an archetypical public good representing broadly common interests for citizens.

The paper is also motivated from some empirical questions in develop-

[1] O'Brien (2005) argues that British naval hegemony over nearly three hundred years was rooted in the a superior power to raise taxes. Brewer (1989) and Hoffman and Rosenthal (1997) discuss the link between the development of taxation and political institutions.

ment economics. Why are rich countries also high tax countries with good enforcement of contracts and property rights? Why do parliamentary democracies have better property rights protection and higher taxes than presidential democracies? Why is it so hard to find evidence in aggregate data that high taxation is negatively related to growth, while there seems to be good evidence that poor property rights protection is?

Figure 1 illustrates the positive correlation between measures of the power to tax and financial development, and between both of these and income per capita. The share of government revenue raised from income taxes as a share of GDP is graphed against the average private credit to GDP ratio (both measured in 1995), for countries with below median income per capita (marked with red dots) and above median income per capita (marked with blue dots). We include a regression line to indicate that income taxes and private credit are positive correlated. Poorer countries are scattered to the south west in the graph, while the richer ones cluster in the north east. Our theory will emphasize that nothing causal can be read into these correlation patterns. However, the cross country correlations are hard to square with simplistic notions that small government is a precondition for the emergence of rich and developed nations, and rather suggest that higher taxation and financial development have common underlying causes.

In this paper, we build a model to better understand some of these theoretical, historical, and empirical issues. Of course, we cannot build a model of everything, so we focus on two specific aspects of state capacity. In our framework, regulation of market supporting measures and tax rates are endogenous "policy choices". But these are constrained by the state's legal and fiscal capacity, "economic institutions" inherited from the past. Current policy choices also reflect "political institutions" inherited from the past. We then explore the relationships between taxes and property rights, redistribution vs. the provision of public goods, income levels, and political regimes. Key to our model is to treat the state's legal and fiscal capacity as ex ante investments under uncertainty.[2]

Beyond the theoretical, historical and empirical work discussed above, our paper is related to several recent strands of literature. In particular, a number of researchers have sought to explain the institutions supporting

[2]The idea of studying dynamic investments in institutions which affect subsequent policy choices is similar in spirit to Lagunoff (2001) and, more generally, to the literature on strategic debt issue – see Persson and Svensson (1989).

financial markets, such as shareholder protection, or the protection of private property rights (see, e.g., La Porta et al, 1998, Rajan and Zingales, 2003, Acemoglu and Johnson, 2005, and Pagano and Volpin, 2005). Our paper shares with this work the treatment of market supporting institutions as endogenous. However, it differs in two important respects. We analyze market supporting institutions together with taxation, which allows us to address the crucial question why a particular ruling group would not provide maximum efficiency of markets and further its own selfish interests through redistributive taxation.[3] One of our key findings is that legal and fiscal capacity are complements, which has a number of interesting implications. A second difference with the financial development literature is the distinction we make between economic institutions and policy choices constrained by these institutions. This distinction allows us to consider how factors such as political instability, conflict and polarization shape institutions.

As already mentioned, we build a simple two-period model where rulers make policy decisions regarding the protection of property rights and the taxation of income, given the constraints of past investments in legal and fiscal capacity. Section 2 studies optimal private decisions in this model. Then, in Section 3 we analyze optimal policy choices for given economic institutions, whether these choices are made by a Utilitarian planner or a politically motivated government. In Section 4 we analyze the optimal investments in legal and fiscal capacity in a variety of political regimes. We derive a number of comparative statics results on the economic and political determinants of legal and fiscal capacity and spell out the implications for economic growth. Section 5 considers four extensions, including the presence of quasi-rents tied to market access for some agents, and purposeful accumulation of private capital. Section 6 presents some empirical evidence consistent with the main predictions of our model. Section 7 concludes.

2 Model and Optimal Private Choices

In this section, we set up our model and study equilibrium private behavior. In subsequent sections, we turn to optimal policy choices for given economic institutions, and go on to the equilibrium investments in legal and fiscal

[3] Acemoglu (2006) considers the spillovers to regulatory policies of the state's capacity to tax, but treats the latter as exogenous.

capacity. Our model has two main moving parts – trade in a private capital market and taxing/spending by government.

Basics There are two periods $s = 1, 2$. Markets are open in both periods and consumers cannot save. In period 1, the government makes investments in institutions, assuming that the world ends in period 2. This simple dynamic framework captures the essentials of a representative time period within a fully specified dynamic model.

There are two groups, $J = A, B$. Group membership is due to some attribute that is observable by everybody, including the government. These groups make up shares β^A, β^B of the population. For simplicity, we assume that all agents within each group have the same wealth level, w^J.

The preferences of all agents are linear in private consumption, as well as in government spending (see below).

Production opportunities As well as differing in their (observable) group membership, individuals also have different (privately observed) production opportunities. Each person can engage in a project where the gross return for individual I is $r_{I,s} \in \{r_L, r_H\}$ and $r_H > r_L$. (Alternatively, think about the L types as having access to a simple storage technology with return r_L). We denote the share of group J agents with high returns by σ^J (the same in each time period), with type H individuals in group J making up a share $\beta^J \sigma^J$ of the total population.

Borrowing, property rights protection, and legal capacity Entrepreneurs can expand the size of projects by borrowing in a competitive capital market. To prevent default, a member of group J can in period s can put up a share of her wealth w^J as collateral. While, contracts between borrowers and lenders are upheld by the legal system, we assume that only a share $p_s^J \leq 1$ of collateral is "effective", where p_s^J is an index for the enforcement of property rights. Since lenders (and borrowers) have linear preferences, p_s^J can be interpreted as the probability that a lender gains access to collateral in case of default.[4] As collateralized investment will earn no less than the (gross) market return r_s in period s, someone from group J can only borrow as much as she will be expected to repay at r_s.

[4] Property rights here refer to protection against risk of expropriation by other private agents, not expropriation by the government, which is ruled out by assumption.

We model p_s^J, $J = A, B$, as a policy choice by the government which is made before private choices are made. We say that property-rights protection is better for group J, when p_s^J is higher, as this allows more borrowing for each piece of collateral. Property-rights protection can be differentiated by observable group J, but not by unobservable type I. Allowing this to be group specific reflects the possibility that resources put into contract enforcement can depend on the sector or geographical location of economic activity. We say that property rights are universal if $p_s^A = p_s^B$, i.e., when everyone in the economy has equal access to contract enforcement.

The government's ex post choice of how well to enforce property rights is constrained by $p_s^J \in [0, \pi_s]$, where the maximum protection level π_s is determined by past investments in "legal capacity". In concrete terms, this reflects legal infrastructure such as building court systems, employing judges and registering property. The initial stock is π_1 and the investment in period 1 is thus given by $\pi_2 - \pi_1$. Because there is no depreciation of legal capacity, we require $\pi_2 - \pi_1 \geq 0$. The costs of such investments are given by $L(\pi_2 - \pi_1)$, an increasing convex function with $L(0) = 0$ and $L_\pi(0) > 0$.

These investment costs could, for example, depend on the legal tradition in the country of study. Because a higher value of π_s allows for more extensive financial contracts (more credit as a share of output), we can also think about π_s as closely related to an index of financial development.

Spending, taxes, and fiscal capacity The other current policy instrument is taxation of the *net* (after lending or borrowing) output from investment projects. The government can only observe net output brought to the market by a member of group J, not whether the output has been derived from a high or low return project or through lending.[5] Thus, tax rates in period s can be made group specific, t_s^J, but not project specific. We will say that the tax system is fair when both groups are taxed at the same rate: $t_s^A = t_s^B$. To allow for redistribution in the simplest possible way, we allow tax rates to be negative.

Taxation is constrained, because any individual can earn a fraction $(1-\tau_s)$ of her returns – either from projects or lending – in an informal sector where he/she avoids taxation. This implies that the tax rates in period s must satisfy $t_s^J \leq \tau_s$ (see Appendix). As with legal capacity, these non-taxable

[5] This parallels the standard informational assumption made in the optimal income tax literature.

fractions are determined by investments. Let τ_1 be the initial (i.e., period 1) stock of "fiscal capacity" (a higher τ raises the feasible tax rate). As legal capacity, fiscal capacity does not depreciate but can be augmented by nonnegative investment in period 1, which costs $F(\tau_2 - \tau_1)$. We assume $F(0) = 0$ and $F_\tau(0) > 0$. It is plausible to think that investments in fiscal capacity become cheaper as an economy develops.

Apart from the need to invest in legal and fiscal capacity and the possibility to redistribute, there is an additional public-goods motive for raising taxes. Public goods have a linear payoff, $\alpha_s G_s$, common to all individuals. We assume that α_s has a distribution H of possible realizations on $[0, X]$ where $X > 1$. This shock is assumed to be *iid* over time. The realized value of α_s is known when taxes t_s^J are set in period s. But when investments in fiscal capacity take place in period 1, the future value α_2 is stochastic and the investing government knows only its distribution. A first-order stochastic dominating shift in this distribution represents greater perceived benefits of public goods, e.g., due to a greater risk of war in future.

Capital market equilibrium Optimal individual choices (see Appendix) imply horizontal demands for borrowing up to the point $\sigma^J \beta^J p_s^J w^J$ by high-return members of group J, i.e., these individuals put up all their wealth as collateral and invest maximally. Conversely, individuals with low returns are happy to lend at any market rate $r_s \geq r_L$, implying a horizontal supplies of lending up to the point $(1 - \sigma^J)\beta^J w^J$ by low-return individuals in group J.

We assume that the maximal supply of lending exceeds the maximal demand for borrowing. This will be the case if the number of high-return projects is relatively low. Then, in a competitive equilibrium, the interest rate will be r_L. If we make the "natural" assumption that lenders in each group invest the same portion, l_s, of their wealth, we can write the market-clearing condition as:

$$(\sigma^A \beta^A p_s^A w^A + \sigma^B \beta^B p_s^B w^B) = l_s((1 - \sigma^A)\beta^A w^A + (1 - \sigma^B)\beta^B w^B) \ . \quad (1)$$

Indirect Utilities Putting this together yields the following indirect utility functions for individuals in group J depending on whether they have access to a low or high return project. These are:

$$v_{H,s}^J(t_s^J, p_s^J, G_s) = \alpha_s G_s + (1 - t_s^J)(r_H + p_s^J(r_H - r_L))w^J \quad (2)$$

and

$$v^J_{L,s}(t^J_s, p^J_s, G_s) = \alpha_s G_s + (1 - t^J_s) r_L w^J \ . \tag{3}$$

Tax bases and government budget constraints As a preliminary, define per capita net output in each group:

$$Y(p^J_s, \sigma^J, w^J) = \{\sigma^J(1 + p^J_s)(r_H - r_L) + r_L\} w^J \ . \tag{4}$$

Notice that this function is increasing in p^J_s, because more property rights protection for group J allows for more financial intermediation which raises net output. It is also increasing in w^J and σ^J since richer individuals can afford larger projects, and surpluses are generated only by agents with high returns. Moreover, the derivative $Y_p(p, \sigma^J, w^J) = (r_H - r_L)\sigma^J w^J$ is increasing in wealth and the share of high-return agents, $Y_{pw}, Y_{p\sigma} > 0$, as both make efficiency gains more important. Note also that $Y_{pp} = 0$.

The government budget constraints are

$$\sum_J t^J_1 \beta^J Y(p^J_1, \sigma^J, w^J) = G_1 + [L(\pi_2 - \pi_1) + F(\tau_2 - \tau_1)] \tag{5}$$

in period 1, and

$$\sum_J t^J_2 \beta^J Y(p^J_2, \sigma^J, w^J) = G_2 \tag{6}$$

in period 2. The different form of the constraints reflects the assumption that there are no investments in period 2.

Government preferences and turnover In each period power is held by a government, which (over)represents group A or group B. We parametrize government preferences by the weights that they attach to the utility of each group. Formally, let $\phi^J_J \geq \beta^J$ denote the weight that group J gives to itself when holding political power, and $\phi^K_J \leq \beta^K$ the weight that group J gives to group $K \neq J$. We normalize so that $\phi^J_J + \phi^K_J = 1$. In this notation, $\phi^J_J = \beta^J$ represents the Utilitarian case. It is most convenient to work with an "overweighting" parameter $\rho = \phi/\beta$. For ease of exposition, we deal with a symmetric case where:

$$\overline{\rho} = \frac{\phi^A_A}{\beta^A} = \frac{\phi^B_B}{\beta^B} \geq \underline{\rho} = \frac{\phi^B_A}{\beta^B} = \frac{\phi^A_B}{\beta^A} \ .$$

Each group thus attaches the same relative weight to its own group vs. the other group. We use the binary indicator $\gamma_s \in \{A, B\}$ to denote the type of government in period s, and the parameter $\gamma^J \in [0, 1]$ to denote the (exogenously given) probability that the policy maker is of type J in each period.

Below, we shall interpret a larger difference $(\overline{\rho} - \underline{\rho})$ as representing a more polarized society, resulting either from greater ethnic or linguistic fractionalization or from a less representative political system.[6] We represent greater political stability as increasing the value of γ^J when group J is in power.

Timing The economy starts out with some fiscal and legal capacity, given by history: $\{\pi_1, \tau_1\}$. The subsequent timing is as follows:

1. Nature determines which private agents have first-period investment opportunities, the first-period value of public goods (military threat), α_1 and first-period political control, γ_1.

2. The first-period government picks a policy vector comprising taxes, property-rights protection levels, government spending and investments in state capacity (economic institutions): $\left\{t_1^A, t_1^B, p_1^A, p_1^B, G_1, \pi_2 - \pi_1, \tau_2 - \tau_1\right\}$ subject to the government budget constraint (5) and anticipating equilibrium private sector responses.

3. Private agents pick their first-period projects, the capital market clears, and agents consume.

4. Nature determines which private agents have second-period investment opportunities, the second-period value of public goods, α_2 and second-period political control, γ_2.

5. The second-period government picks a policy vector comprising taxes, property-rights protection levels, and government spending: $\left\{t_2^A, t_2^B, p_2^A, p_2^B, G_2\right\}$ subject to the government budget constraint (6) and anticipating equilibrium private sector responses.

6. Private agents pick their second-period projects, the capital market clears, and agents consume.

At this point time ends. As we have already described private-sector behavior, we can focus on government behavior in the following.

[6] In a crude way, it can capture the idea of checks and balances on state power.

3 Optimal Policy

We begin by studying the choice of taxes, property-rights enforcement, and public spending in each period. Given the structure of our model, these choices can be studied separably from the investment decisions in period 1.

Let group J be in power and group K be out of power. Aggregate utility of group J in period s can be written as $\beta^J[\alpha_s G_s + \left(1 - t_s^J\right) Y(p_s^J, \sigma^J, w^J)]$, with an analogous expression or group K. Therefore, the policy vector $\left\{t_s^J, t_s^K, p_s^J, p_s^K, G\right\}$ chosen at stages (2) and (5) maximizes the objective:

$$[\alpha_s G_s + \overline{\rho}\left(1 - t_s^J\right) \beta^J Y(p_s^J, \sigma^J, w^J) + \underline{\rho}\left(1 - t_s^K\right) \beta^K Y(p_s^K, \sigma^K, w^K)] \ , \quad (7)$$

for given α_s subject to the government budget constraint, (5) or (6), and the "institutional" constraints:

$$p_s^J \leq \pi_s,\ p_s^K \leq \pi_s,\ t_s^J \leq \tau_s \text{ and } t_s^K \leq \tau_s \ .$$

Our first result is:

Proposition 1 (*Diamond and Mirrlees*) *For $s \in \{1, 2\}$ and any $\gamma_s \in \{A, B\}$, $\alpha_s \in [0, X]$, optimal property rights always fully utilize all legal capacity, $p_s^J = p_s^K = \pi_s$.*

The formal argument is straightforward. Intuitively, better property-rights enforcement raises both public and private goods, for any given tax vector $\left(t_s^A, t_s^B\right)$. That legal capacity is always fully utilized ex post is essentially an application of the famous Diamond and Mirrlees (1971) production efficiency result. It serves as a useful benchmark. However, in Section 5 we discuss a set of conditions under which it fails to hold. As will be clear already in Section 4, however, the efficient use of legal capacity in each period certainly *does not* imply that every economy and polity will have high levels of property rights protection, as these depend directly on investments in legal capacity.

Optimal taxation is a little more complicated, as it depends on the realizations of α_s and γ_s. The first result applies when public goods are less valuable than transfers to the ruling group, and is described as follows.

Proposition 2 *Suppose that $\alpha_s < \overline{\rho}$ and $\overline{\rho} > \underline{\rho}$. Then, for all $J, K \in \{A, B\}$, $t_s^K = \tau_s$ for $s \in \{0, 1\}$. The first-period tax on the ruling group is*

$$t_1^J = \frac{[L(\pi_2 - \pi_1) + F(\tau_2 - \tau_1)] - \tau_1 \beta^K Y(\pi_1, \sigma^K, w^K)}{\beta^J Y(\pi_1, \sigma^J, w^J)} \ ,$$

while the second-period tax on the ruling group is:

$$t_2^J = \frac{-\tau_2 \beta^K Y(\pi_2, \sigma^K, w^K)}{\beta^J Y(\pi_2, \sigma^J, w^J)} \ .$$

Finally, public goods provision is set equal to zero, i.e., $G_s = 0$ *for* $s \in \{0, 1\}$.

To derive this result formally, substitute the government budget constraints into the objective (7) and take the derivative with regard to each tax rate. Because the resulting derivatives are constant, it is optimal to choose the corner solutions described in **Proposition 2.**

The result makes intuitive sense. As the ruling group values its own welfare and \$1 of public goods are less valuable than \$1 of private income, it finds it optimal to provide no public goods and set a maximal tax on the non-ruling group to finance a transfer to itself. In period 1, this transfer is smaller to the extent that public revenues are set aside for financing improvements in state capacity. Note, that fiscal capacity is *less* than fully utilized in this case.[7]

Proposition 2 holds provided that $\overline{\rho} > \underline{\rho}$. In the Utilitarian case where $\overline{\rho} = \underline{\rho}$, there is no gain from distributing from one group to another and no need to set any taxes at all (although the levels described in **Proposition 2** remain weakly optimal in this case).

We now turn to the case where public goods are valuable, e.g., a "war time" economy. Following the same steps as in the derivation of **Proposition 2**, we have:

Proposition 3 *Suppose that* $\alpha_s \geq \overline{\rho}$. *Then for* $s \in \{0, 1\}$ *taxable capacity on both groups is fully utilized,*

$$t_s^J = t_s^K = \tau_s \ ,$$

and public goods are provided as

$$G_1 = \tau_1 \left[\beta^J Y(\pi_1, \sigma^J, w^J) + \beta^K Y(\pi_1, \sigma^K, w^K)\right] - L(\pi_2 - \pi_1) + F(\tau_2 - \tau_1)$$

and

$$G_2 = \tau_2 \left[\beta^J Y(\pi_2, \sigma^J, w^J) + \beta^K Y(\pi_2, \sigma^K, w^K)\right] \ .$$

[7] We are assuming that fiscal capacity does not affect the size of the income transfer that can be made to group J.

Here, taxes are used solely to finance public goods (there are no transfers in either period), except that the period 1 government also needs to pay for investments in state capacity (which implies less public goods provision).

Together, **Propositions 2** and **3** reveal exactly how political control with $\overline{\rho} > \underline{\rho}$ distorts policy outcomes, compared to a Utilitarian outcome. It implies a *taxation distortion,* whereby one group always pays maximal taxes to fund redistribution, whereas the Utilitarian criterion does not favor such redistribution. It also implies a *public goods distortion,* whereby public goods are not provided even though they are valuable according to the Utilitarian criterion: $\alpha_s \geq 1$. The size of this distortion depends on the size of $\overline{\rho}$. If $\overline{\rho}$ is very large, or public goods are not very valuable (war not very likely) so the distribution of α is skewed to the left, the state is used as an instrument for redistribution rather than providing socially valuable public goods.

Since institutions have been chosen prior to the realization of α, it is useful to see the public goods distortion in an ex ante sense. Public goods are *not* provided with probability $H(\overline{\rho})$ compared to $H(1)$ in the case of a Utilitarian planner.

4 Optimal Investment in State Capacity

We now turn to the investments in legal and fiscal capacity in period 1. To characterize the optimal investments, we need some further results and notation.

4.1 Preliminaries

Assume that group J holds power in period 1. At this point it faces uncertainty over the period 2 realization of α as well as government identity. Drawing on the results in **Propositions 1-3** and going through some algebra, the Appendix shows that the expected payoff to group J as a function of the two forms of state capacity can be written:

$$\begin{aligned} W^J(\tau_2, \pi_2) &= \overline{\rho}\beta^J Y(\pi_2, \sigma^J, w^J) + \underline{\rho}\beta^K Y(\pi_2, \sigma^K, w^K) \\ &\quad + \tau_2 \left\{ [\lambda_2^J - \overline{\rho}]\beta^J Y(\pi_2, \sigma^J, w^J) + [\lambda_2^J - \underline{\rho}]\beta^K Y(\pi_2, \sigma^K, w^K) \right\}, \end{aligned} \tag{8}$$

where:

$$\lambda_2^J = [1 - H(\overline{\rho})]\, E(\alpha_2 | \alpha_2 \geq \overline{\rho}) + H(\overline{\rho}) \left[\gamma^J \overline{\rho} + \left(1 - \gamma^J\right) \underline{\rho} \right] \tag{9}$$

is the *expected* (marginal) value of period-2 public funds to group J. Observe that (one minus) the probability of turnover γ^J *only* enters the payoff function of the ruling group through λ_2^J.

Using these results, we can state the optimal investment decision in state capacity, as the maximization of:

$$W^J(\tau_2, \pi_2) - \lambda(\alpha_1)\left[L(\tau_2 - \tau_1) + F(\tau_2 - \tau_1)\right],$$

where $\lambda(\alpha_1) = \max\{\alpha_1, \overline{\rho}\}$ is the *realized* value of the cost of public funds in period 1.

The first-order conditions for investing in state capacity are:

$$\begin{aligned} \left[\rho^J + \tau_2(\lambda_2^J - \rho^J)\right](r_H - r_L)\,\Omega &\leqslant \lambda(\alpha_1)\,L_\pi(\pi_2 - \pi_1) \\ \text{c.s. } \pi_2 - \pi_1 &\geqslant 0 \end{aligned} \tag{10}$$

and

$$\begin{aligned} (\lambda_2^J - \rho^J)\left[(1+\pi_2)(r_H - r_L)\,\Omega + r_L\left(\beta^J w^J + \beta^K w^K\right)\right] &\leqslant \lambda(\alpha_1)\,F_\tau(\tau_2 - \tau_1) \\ \text{c.s. } \tau_2 - \tau_1 &\geqslant 0\,, \end{aligned} \tag{11}$$

where $\Omega = \left[\sigma^A w^A \beta^A + \sigma^B w^B \beta^B\right]$ is total pledgeable wealth by agents with high-return projects, and where $\rho^J = \omega^J \overline{\rho} + \omega^K \underline{\rho}$, with $\omega^J = \frac{\sigma^J w^J \beta^J}{\Omega}$, $J \in \{A, B\}$, is a weighted sum of the two groups' policy weights.[8] Note that ω^J and ω^K reflect each groups economic power in terms of investment opportunities. Conditions (10) and (11) summarize all the forces that shape investment in state capacity.

Before exploring in detail the implications of (10) and (11) for observable outcomes, observe that a *necessary* condition for group J to invest anything in taxable capacity is:

$$\lambda_2^J - \rho^J = (1 - H(\overline{\rho}))\,E\{\alpha_2 | \alpha_2 \geq \overline{\rho}\} + H(\overline{\rho})\left[(\gamma^J - \omega^J)\overline{\rho} + (\gamma^K - \omega^K)\underline{\rho}\right] \geq 0\,. \tag{12}$$

The first term in (12) is always positive, while the second could be positive or negative depending on the distribution of economic power, as measured by the ω's, and political power, as measured by the γ's. In the Utilitarian case $\overline{\rho} = \underline{\rho}$, the second term of (12) is zero. This makes intuitive sense, because

[8] This assumes that there is sufficient inherited fiscal capacity to fund these investments at the desired level.

(with linear utility) a Utilitarian decision-maker has no intrinsic demand for redistribution and no need for fiscal capacity if there is no need for the public good. It is then easy to see that if the expected demand for public goods is sufficiently high, both groups will demand a positive level of taxable capacity. If the state is used mainly for distributive purposes, however, the incentives to invest in fiscal capacity are weaker. The formula in (12) also shows that, if economic power and political power are broadly similar, i.e., $\gamma^J \approx \omega^J$ and $(1-\gamma^J) = \gamma^K \approx \omega^K$, it is likely that $\lambda_2^J - \rho^J \geq 0$.

If (12) holds for both groups $J \in \{A, B\}$, the left hand side of (10) is increasing in τ_2 and the left hand side of (11) is increasing in π_2. Then, investments in legal and fiscal capacity are *complements*. As a result, the demand for fiscal capacity – to finance redistribution or public goods – is greater when the economy is more productive, as a given increment of taxation raises more revenues. Equally, having larger fiscal capacity gives an extra incentive to invest in legal capacity to support markets. This complementarity is of genuine economic interest.

Moreover, if (12) holds for $J \in \{A, B\}$ this greatly simplifies the comparative statics. Under complementarity, the payoff functions are supermodular and we can exploit results on monotone comparative statics: any factor that raises the value of the left hand side of either (10) or (11) will raise investments in both forms of state capacity. From now on, we thus focus on the case where $\lambda_2^J - \rho^J \geq 0$ for both groups.

4.2 Determinants of State Capacity

What does the model say about investment in economic institutions? We first prove a set of results that hold under very general conditions and regardless of which group is in power, exploiting the complementarity of investment decisions.[9] Suppose that we write the objective function in "reduced form" as $f(\tau_2, \pi_2; m)$ for relevant "parameters" m and suppose that $f(\cdot)$ is supermodular in (τ_2, π_2). Then (τ_2, π_2) is monotonically increasing in m if $\partial^2 f(\cdot)/\partial\tau_2\partial m \geq 0$ and $\partial^2 f(\cdot)/\partial\pi_2\partial m \geq 0$. This is exactly the condition that a change in a certain parameter raises the left hand side of (11) or (10).

As a second step, we derive more specific results on how the distribution of economic and political power affect institution building. These latter results

[9] See Theorems 5 and 6 in Milgrom and Shannon (1994). This result is originally due to Topkis – and has been generalized in Milgrom and Shannon (1994) Theorem 4.

require some regularity conditions. The first set of results refer to weak inequalities and are strict only at an interior optimum of the investment decisions.

Proposition 4 *Countries with higher wealth, as measured by* Ω, *optimally choose greater state capacity. Increasing the gains from trade in markets, as measured by higher* σ^A, σ^B,*or* $(r_H - r_L)$, *also leads to greater investment in both fiscal and legal capacity.*

This implies that richer countries will optimally choose to have greater state capacity. The marginal benefit to investing in fiscal capacity is related to the size of national income, the term $(1+\pi_2)(r_H - r_L)\Omega + r_L\left(\beta^J w^J + \beta^K w^K\right)$ in (11). And, the marginal benefit of investing in legal capacity is proportional to the marginal benefit of better property rights, the term $(r_H - r_L)\Omega$ in (10). Note that **Proposition 4** applies, even if higher wealth or better trading opportunities accrue exclusively to the group that is not in power. This is because taxes finance public goods and this creates a common interest in investing even if $\underline{\rho} = 0$.

The results in **Proposition 4** are consistent with the observation in Figure 1 that the size of the public sector, as well as measures of the protection of property rights are positively correlated with income both across and within countries. They are also consistent with the argument by Rajan and Zingales (2003) that financial development is positively correlated with openness to international trade, because the latter expands the returns to reallocating capital. These authors present historical evidence that financial development and openness have co-varied, both being high in the period before WWI, low in the interwar period and immediately after WWII, and then higher again in the last 30-40 years.[10] We return to the relationship between financial development and income (growth) in Sections 4.3 and 5.4 below.

We next explore how demand for public goods affects the incentive to invest.

Proposition 5 *A higher expected demand for public goods, a first order stochastically dominating shift in* α, *raises* λ_2^J *and thereby investment in state capacity. Investments in fiscal and legal capacity are decreasing in* $\lambda(\alpha_1)$.

[10]The informal theoretical discussion by Rajan and Zingales emphasizes the rent-protection incentives of incumbents, which do not appear in our basic model, but a similar point arises in Section 5.3 below.

The first result can be interpreted as a version of Tilly's (1990) hypothesis on the importance of war in building state capacity. However, it clearly applies more widely to any public goods that are national in character. If the demand for such goods is expected to be high, there is a large incentive to invest in state capacity as these are common interest investments. But such investments have to be financed. This effect is represented in the parameter $\lambda(\alpha_1)$. When the period 1 demand for public goods is great, public funds are at a premium and investments lower. The greatest incentive to invest arises when $\lambda(\alpha_1) = \overline{\rho}$, i.e., when period 1 taxes are used for redistribution.

The next results concern the impact of political turnover.

Proposition 6 *An increase in political stability, represented by an increase in γ^J, raises λ_2^J and thereby investment in state capacity.*

To see this, observe that

$$\frac{\partial \lambda_2^J}{\partial \gamma^J} = H(\overline{\rho})\left(\overline{\rho} - \underline{\rho}\right) \geq 0 \quad ,$$

i.e., a higher probability of group J remaining in power (lower turnover) raises the group's expected value of public funds in future. Intuitively, the risk is smaller that the investing group J will see group K use the state for redistributive purposes against group J's interest in the future. This effect is also lower if $\overline{\rho} - \underline{\rho}$ is close to zero. As mentioned before, we can interpret the relative weight that the political process places on the ruling group versus the non-ruling group, i.e., $\bar{\rho} - \underline{\rho}$, as reflecting either a less representative political system offering less minority protection, or a high degree of ethnic or linguistic conflict.

A testable prediction is thus that we should observe less developed economic institutions in politically unstable countries, and that the negative effect should be particularly large in less representative or conflict-ridden political systems. Alesina, Baqir, and Easterly (1999) have emphasized how ethnically divided communities spend less on public goods. This property is clearly true in our model, as the probability of no public-goods provision is given by $H(\overline{\rho})$. But what we say here is that such divisions interact with political instability to curtail investments in legal and fiscal capacity. We know of no empirical study of these issues.

A good illustrative historical case study for how political stability can shape investment in state capacity comes from England after the Glorious

Revolution in 1688. This lead to the political dominance of the Whigs until the revival of the Tories under George III. It was also a period in which there was considerable investment in state capacity by a dominant elite.

In addition to this interaction effect, we are interested in the direct effect of higher polarization. To get at this, consider the effect of rasing $\overline{\rho}$, subject to the constraint that $\beta^J\overline{\rho}+\left(1-\beta^J\right)\underline{\rho}=1$. In general, this effect is quite complicated, interacting with the distribution of political power as represented by γ^J and economic power as represented by ω^J. We can neutralize these effects by supposing that $\beta^J=\omega^J=\gamma^J$. While the assumption $\gamma^J=\beta^J$ says that political power is allocated (probabilistically) in proportion to population size, $\beta^J=\omega^J$ implies that $\sigma^J w^J$ is the same in both groups, i.e., they have the same opportunities to invest.

We refer to this comparative static as an institutionalized polarization result, as we have in mind a measure of consensual political arrangements. For this case, we have:

Proposition 7 *If $\beta^J=\omega^J=\gamma^J$, a decrease in institutionalized polarization, as measured by $\overline{\rho}-\underline{\rho}$, raises investment in both fiscal and legal capacity.*

The key to this result is that the assumption $\beta^J=\omega^J=\gamma^J$ eliminates the effect of polarization on ρ^J. If we assume that $\beta^J=\gamma^J$ and use $\beta^J\overline{\rho}+\left(1-\beta^J\right)\underline{\rho}=1$ to substitute out $\underline{\rho}$, then we get $\lambda_2^J=\int_{\overline{\rho}}^X \alpha_2 dH(\alpha)+H(\overline{\rho})$, which is independent of J. The effect of an increase in $\overline{\rho}$ on λ_2^J is then given by:

$$\frac{\partial\lambda_2^J}{\partial\overline{\rho}}=h(\overline{\rho})\left[1-\overline{\rho}\right]<0\ .$$

Intuitively, increasing polarization makes the outcome under redistributive policy look worse for the investing group.

A long tradition in political science, e.g., Lijphart (1999) considers proportional electoral systems more consensual than majoritarian systems, while Persson, Roland and Tabellini (2000) argue that parliamentary democracies are more representative than presidential democracies. **Proposition 7** suggests that we should see more investment in legal and fiscal capacity in such democracies, which appears consistent with the findings in Persson and Tabellini (2004) that parliamentary and proportional democracies have much higher government spending. The comparative static in **Proposition 7** also captures the idea that states with greater checks and balances are likely to

have more state capacity. This parallels the argument of Schultz and Weingast (2003) who suggests that greater checks and balances in British political arrangements facilitated revenue raising leading to triumph over the French in the Napoleonic wars.

Finally, we would like to say something specific the distribution of economic power and investments in state capacity. To do this, we simplify the model and set $r_L = 0$. We then look at the effect of a higher share of wealth in the hands of group J, i.e., an increase in ω^J. With a few additional regulatory conditions, we obtain:

Proposition 8 *Under Assumption 1 (see the Appendix), an increase in the economic power of the ruling group, i.e., an increase in ω^J, increases investment in legal capacity and reduces investment in fiscal capacity.*

Proof: see the Appendix.

The argument is straightforward to see. An increase in ω^J raises ρ^J which, in turn, raises the marginal return to legal capacity but *reduces* the marginal return to fiscal capacity. Under Assumption 1, the comparative statics go in the expected direction, i.e. according to the change in the marginal benefits of the two types of state capacity.

Proposition 8 speaks to the wealth distribution between the groups in and out of power. It suggests that, *ceteris paribus*, a more unequal income distribution raises investments in legal capacity and cuts investments in fiscal capacity if the rich has a hold on political power, whereas the effect goes the other way if the poor has political power. Because the effect of ω^J on ρ^J is larger, the higher is $\overline{\rho}$ this effect should be most pronounced in autocracies. In other words, the model predicts the protection of property rights to improve (deteriorate) and taxation to fall (rise) as income inequality becomes more pronounced in autocracies ruled by rich elites (poor masses).

Altogether, **Propositions 4-8** give a fairly complete understanding of the forces that shape the incentives to invest in state capacity.

4.3 Implications for Economic Growth

The simple structure of the model allows us to develop implications for economic growth. The latter can be defined as the proportional increase in national income from period 1 to period 2. Using the definition of per capita

(group) outputs in (4) and the results in Proposition 1, a little algebra establishes:

$$\frac{Y_2 - Y_1}{Y_1} = \frac{(\pi_2 - \pi_1)(r_H - r_L)\Omega}{(1+\pi_1)(r_H - r_L)\Omega + r_L \sum_J \beta^J w^J} .$$

This shows that the growth rate is directly proportional to the investments in legal capacity. Since there is no private accumulation, this achieved solely by facilitating gains from trade – achieving higher TFP. Thus, there are strong reasons to see a positive correlation between improvements of market-supporting economic institutions and income growth.

Legal capacity in our model is closely related to financial development due to the amount of private credit being proportional to π. Many empirical studies have measured financial development precisely in this way and found it to be positively correlated with growth of GDP per capita. According to our model financial deepening can indeed cause growth. But the relation can easily go the other way. As we have seen in **Proposition 4**, higher income generally raises the incentives to invest in legal capacity leading to financial deepening.

In terms of fiscal institutions and growth, the complementarity between fiscal and legal capacity delivers clear cut results. If higher legal capacity is driven by any of the determinants emphasized in Propositions 4-7, we expect it go hand-in-hand with higher fiscal capacity. Variation in these forces would lead us to observe a *positive* correlation between higher taxes and higher growth. On the other hand, higher legal capacity driven by a more unequal income distribution, as in Proposition 8, would induce a negative correlation between taxes and growth.

These observations are interesting given the findings in the macro literature on growth and development. Many researchers have found a positive correlation between measures of property rights protection or financial development and economic growth (see e.g., King and Levine, 1993 and Hall and Jones, 1999 and a number of subsequent papers). The discussion above cautions us that such correlations may indeed reflect a two-way relationship. On the other hand, those expecting to find a negative relation between taxes and growth have basically come up empty-handed (see e.g., the overview in Benabou, 1997). As simple as it is, our model suggest a possible reason for these findings, namely the basic complementarity between the two components of state capacity.

5 Extensions

5.1 Over-investment in Long-run Capacity

We now discuss the long-run outcome after many alternations in power $\left(\gamma^J < 1\right)$ and many different realizations of α. This outcome can be studied formally by extending the two period model to an infinite time horizon and studying the Markov perfect equilibria of the ensuing game. The results in Sections 3 and 4 would then be relevant to the transitional dynamics to the steady state. Developing this analysis in detail would require a considerable investment in further notation. Instead, we take a shortcut by characterizing the level of fiscal and legal capacity $\{\pi_J^*, \tau_J^*\}$ at which neither group would wish to make a further investment in state capacity. We would expect the economy to converge to this outcome, because at capacity levels below these at least one group would wish to make further investments in state capacity.

Let $\{\pi_J^*, \tau_J^*\}$ be defined by:

$$\left(\rho^J + \tau_J^* \left[\lambda_2^J - \rho^J\right]\right)(r_H - r_L)\,\Omega = \overline{\rho} L_\tau(0) \tag{13}$$

and

$$\left[\lambda_2^J - \rho^J\right]\left[\left[1 + \pi_J^*\right](r_H - r_L)\,\Omega + r_L\left(\beta^J w^J + \beta^K w^K\right)\right] = \overline{\rho} F_\pi(0) \ . \tag{14}$$

By multiplying the costs by $\bar{\rho}$, we are effectively assuming that the marginal cost of investing in state capacity is low. These could be thought of as "peace time" investments in state capacity.

There are two possible cases. In the first one group prefers more fiscal and the other group more legal capacity. To see when this is true, observe that:

$$\left[\lambda_2^J - \rho^J\right] - \left[\lambda_2^K - \rho^K\right] = \left[\left(H(\bar{\rho})\left(2\gamma^J - 1\right)\right) - \left(2\omega^J - 1\right)\right] \cdot \left[\overline{\rho} - \underline{\rho}\right]$$

and

$$\rho^J - \rho^K = \left(2\omega^J - 1\right) \cdot \left[\overline{\rho} - \underline{\rho}\right] \ .$$

These conditions are more likely fulfilled when $\gamma^J \simeq \frac{1}{2}$ and political control fluctuates evenly between the groups, and/or when $H(\overline{\rho}) \simeq 0$ so that provision of public goods is very likely. In this case, the distribution of investment demands will determine which group prefers more fiscal and which more legal capacity.

Suppose that $H(\overline{\rho})\left(2\gamma^J - 1\right) \simeq 0$ and $\omega^A > 1/2$. Then $\pi_A^* > \pi_B^*$ and $\tau_A^* < \tau_B^*$. In this case, we expect state capacity to evolve such that group A eventually gets its preferred level of legal capacity and group B its preferred level of fiscal capacity. However, long-run state capacity then becomes too high in a well-defined sense. Since investments in state capacity are strategic complements in this setting, both groups would prefer lower levels of both fiscal and legal capacity. This result suggests that in the long-run states may become "too powerful" in the sense that each group would prefer some aspect of state capacity to be weaker.[11]

The second case is that where one group prefers more fiscal *and* legal capacity. This occurs when $H(\overline{\rho})\left(2\gamma^J - 1\right)$ and $\left(2\omega^J - 1\right)$ have the same sign and the former expression is larger in absolute terms. Intuitively, one group has dominance in both wealth and political power. In this case, long-run state capacity will be determined by the preferences of the political/economic elite even if, along the way, non-elite groups occasionally hold power.

5.2 Pure Distribution

So far, we have considered the case $\lambda^J > \rho^J$. This can be true for both groups only when there is sufficient demand for common-interest public goods. We now focus on what happens when $X < \overline{\rho}$. In this case we have:

$$\lambda_2^J - \rho^J = \left(\gamma^J - \omega^J\right)\left(\overline{\rho} - \underline{\rho}\right) \ .$$

an expression that can be positive for at most one group. Hence, investment in fiscal and legal capacity are no longer complements. In particular, the group whose political power is lower than its economic power, $\gamma^J < \omega^J$, will not wish to invest in fiscal capacity at all because taxation only redistributes and on average this benefits group K at group J's expense. Past investments in fiscal capacity, this will tend to lower investments in legal capacity, because the benefits of legal capacity also tend to accrue to group K. State capacity will thus develop in a lop-sided way, since only the "left-wing" group whose political power exceeds its economic power will invest in the state. This

[11] In cases where fiscal and legal capacity can depreciate, this would lead us to expect that different types of government would favor either market development (through legal capacity) or greater taxation (through fiscal capacity). This parallels the shades of political opinion that characterize the main political forces apparent in advanced democracies.

further illustrates why a high demand for common public goods will boost the development of state capacity.

5.3 Labor Markets and Quasi-Rents

Proposition 1 showed that it is always optimal to fully utilize legal capacity – doing so is Pareto superior. In this section, we show that pecuniary externalities – factor-price effects in the language of Acemoglu (2006) – may lead to one group being excluded from fully utilizing available legal capacity. We show that this is more likely to happen when political institutions are polarized and when taxable capacity is low. The latter may appear somewhat surprising at first glance, but is really a further application of Diamond and Mirrlees (1971)'s insights.[12] If there are sufficient powers to tax, then it is optimal to maximize national income and to use the tax system to redistribute it. Using the access to the legal system as a form of redistribution is generally dominated by taxation. This gives another reason why an effective tax system can lead to an increase in national income.

To capture these ideas in the simplest possible way, we keep the basic set-up from above, but add a labor market. This will be a source of quasi-rents since a group with greater productive capital may prefer to have lower wages. Lower wages, in turn, may be achieved by denying the other group full access to the legal system.

Suppose now that $r_L = 0$. A fraction σ^J of each group has the opportunity to develop a project using labor, ℓ^J, and capital, k^J ,using a constant returns to scale production technology, written as $\ell^J Z\left(K^J\right)$ .where $\eta(x) = -\frac{Z_{xx}(x)x}{Z_x(x)} \in [0,1]$, and K^J denotes the group J capital-labor ratio $k^J/\ell^J = w^J\left(1+p^J\right)/\ell^J$.[13] Let $K\left(p^A, p^B\right) = [\beta^A\sigma^A w^A\left(1+p^A\right) + \beta^B\sigma^B w^B\left(1+p^B\right)]/\ell$ be the aggregate capital-labor ratio, where $\ell = \beta^A\left(1-\sigma^A\right) + \beta^B\left(1-\sigma^B\right)$ is aggregate supply of labor. Agents who do not develop projects become laborers and each individual is endowed with one unit of labor, which

[12] In this section, the introduction of a labor market introduces untaxed quasi-rents. This is analogous to what happens when there is decreasing returns in the original Diamond-Mirrlees model and no taxation of pure profits.

[13] The assumption on $\eta(x)$ always holds for a Cobb-Douglas production function and also for a CES function:

$$[\zeta x^{\chi} + (1-\zeta)]^{\frac{1}{\chi}}$$

provided that $\chi \in [0,1]$.

she supplies inelastically.

It is straightforward to see that equilibrium labor demand, $\hat{\ell}^J$, by a type J entrepreneur satisfies:

$$Z\left(K^J\right) - Z_x\left(K^J\right) K^J = W \ ,$$

where W is the economy wide wage rate. There is a common labor market where the equilibrium wage rate is $\hat{W}\left(p^A, p^B\right)$. This implies

$$Z\left(K\left(p^A, p^B\right)\right) - Z_x\left(K\left(p^A, p^B\right)\right) K\left(p^A, p^B\right) = \hat{W}\left(p^A, p^B\right) \ .$$

Observe that:

$$\frac{\partial \hat{W}}{\partial p^J} = Z_x\left(K\left(p^A, p^B\right)\right) \cdot \eta\left(K\left(p^A, p^B\right)\right) \frac{\beta^J \sigma^J w^J}{\ell} > 0 \text{ where } J \in \{A, B\} \ .$$

This expression just formalizes an intuitive fact: the wage rate is higher when more capital is productively employed in the economy.

Finally, we derive the per capita income of a "representative member" of group J, when the level of legal enforcement is p^J for members of their own group and p^K for members of the other group:

$$\hat{Y}^J\left(p^J, p^K\right) = \left(1 - \sigma^J\right) \hat{W}\left(p^J, p^K\right) + \sigma^J \left[\hat{\ell}^J Z\left(K^J\right) - \hat{W}\left(p^J, p^K\right) \hat{\ell}^J\right] \ .$$

Clearly, group J's income depend on group K's property rights, p^K, through the endogenous wage rate. If group J has a net demand for labor, it prefers a lower wage rate. This can be achieved if group K has less access to legal services.

This model can be used to illustrate when a conflict of interest in property-rights enforcement can lead to under-exploited legal capacity. Intuitively, this happens precisely when one group wishes to keep wages low. We now have:

Proposition 9 *If $\overline{\rho} - \underline{\rho} = 0$ or $\tau = 1$ legal capacity is always fully utilized. For high enough σ^J, there exists $\hat{\tau}\left(\overline{\rho}\right)$ such that $p^K = 0$ for all $\tau \leq \hat{\tau}\left(\overline{\rho}\right)$*

This proposition carries two key insights. If there is no institutionalized polarization, $\left(\left(\overline{\rho} - \underline{\rho}\right) = 0\right)$ we are guaranteed full use of legal capacity ex post. But if political control matters $\left(\left(\overline{\rho} - \underline{\rho}\right) > 0\right)$ and taxable capacity is low, it becomes optimal for a ruling group to completely exclude the other

group from use of the legal system. This reflects a pecuniary externality: by granting full property rights, the ruling group shuts off a supply of cheap labor. While not fully exploiting existing legal capacity is ex post Pareto efficient, given the available fiscal instruments, it leads to lower national income. It is a violation of production efficiency.

We can show that an analogous mechanism applies when we relax the assumption in Section 2 that the supply of capital by agents with low returns is always large enough to satisfy the demand from high-return groups. When capital is scarce enough to invalidate this assumption, the ruling group once again finds it optimal to deny the non-ruling group full property-rights protection ex post, so as to ensure access to capital to its own group.

5.4 Endogenous Private Accumulation

We now demonstrate what happens when private accumulation is added to the model. We show that building fiscal capacity has a "standard" negative effect on economic growth, while – perhaps less expectedly – building legal capacity has an additional positive effect on growth through its affect on accumulation.

The simplest way to add private accumulation is to assume that it takes place between stages 1 and 2 in the previous model. Individuals with a high-return project at stage 1 now also have access to an increasing and concave production technology in *both* time periods, which is given by:

$$y_{H,s}^J = Z(k_{H,s}^J) \ ,$$

where $\eta = -\frac{Z_{xx}(x)x}{Z_x(x)} \in [0,1]$, and $k_{H,s}^J = (1+p_s^J)w_s^J$. Thus, having a high return is now persistent at the individual level. We allow individuals in the high-return group to set aside a portion of their wealth in period 1 to augment their period 2 wealth. We assume that

$$w_{H,1}^J \leqslant w^J, \quad \text{and} \quad w_{H,2}^J = w^J + (w^J - w_{H,1}^J) \ . \tag{15}$$

Hence, negative accumulation in period one is ruled out. To simplify the notation, we set $r_L = 0$.

With this timing, government choices are exactly as described in Sections 3 and 4 above, since private choices have already been made at the time when period 2 state capacity is chosen. High-return individuals make their accumulation decisions under rational expectations about government

choices, which they take as exogenous. Let $E\left(t_2^J\right)$ be the expected period 2 taxes faced by a member of group J. Then the accumulation decisions of high-return individuals solve the following problem

$$\text{Max}_{w_{H,2}^J}\ Z[(w_{H,1}^J(1+\pi_1)](1-t_1^J)+Z[w_{H,2}^J(1+\pi_2)]\left(1-E(t_2^J)\right)\ ,$$

subject to (15).

We are interested in how the solution depends on τ_2 and π_2. The results can be summarized in:

Proposition 10 *Accumulation for both groups, $w_{H,2}^J$, $J \in \{A;B\}$, is increasing in period 2 legal capacity π_2, It is decreasing in period 2 fiscal capacity τ_2 as long as public goods are valuable enough.*

The first part says that investments in legal capacity unambiguously improve private investment incentives, because future wealth can be "collateralized", generating high investment returns.[14] The second part is standard effect of taxation on incentives. This is relevant when public goods are valuable enough, since no group will then face a lower expected tax as fiscal capacity expands, due to more redistribution.

How do these results alter our previous conclusions about economic growth in Section 4.3? Consider a first-order approximation to the economy's growth rate around the point where $\pi_2 = \pi_1$ and $w_{H,2}^J = w_{H,1}^J = w^J$:

$$\frac{Y_2 - Y_1}{Y_1} \simeq \frac{\sum_J \beta^J \sigma^J Z_k[(1+\pi_1)w^J][w^J(\pi_2-\pi_1)+(1+\pi_1)2(w_{H,2}^J - w^J)]}{Y_1} \tag{16}$$

The first term in (16) represents the effect of improved institutions on growth for a given level of capital. The second term reflects the feedback of improvements in state capacity on private accumulation decisions.

Combining this expression together with **Proposition 10** yields:

Corollary 11 *Consider a change in the environment that raises investments in state capacity $\{\pi_2, \tau_2\}$. Compared to the economy without private accumulation, we get an additional positive effect on growth, via the positive effect of π_2 on accumulation, and a negative effect on growth, via the negative effect of τ_2 on accumulation.*

[14] The assumption $\eta(x) \leq 1$, is needed to ensure that investment returns do not fall too fast as capital applied in period two production increases.

This shows how fiscal capacity taken in isolation will generally have a negative affect on growth, once we endogenize private accumulation of wealth. However, the complementarity between fiscal and legal capacity still holds, so we typically observe an expansion of fiscal capacity together with an expansion of legal capacity. With endogenous private accumulation, the latter has an additional positive effect on growth. Moreover, as we have discussed in Section 4.3, higher growth implies a stronger incentive to invest in legal capacity. A more full-fledged analysis would also consider how negative incentive effects of tax capacity on private accumulation would feed back onto the government's investments in state capacity.[15]

6 A First Look at the Data

The model presented in this paper suggests that fiscal systems and market-supporting legal institutions (particularly those that foster financial development) should be considered as jointly endogenous to a large set of economic, political and social variables. In this section, we take a preliminary look at data on measures of financial development, contract enforcement and tax structure. We explore the correlations between these outcome variables and the determinants suggested by our model.

The outcomes include three sets of independent variables. We hypothesize that the historical incidence of war serves as a proxy for the past demand for common public goods, G. Then, the model has the non-trivial implication that this proxy should be correlated with *both* forms of state capacity today. We use data from the Correlates of War data base to create a measure of how large a share of the years between 1800 (or the independence year if later) and 1975 that a country was involved in an external conflict.[16]

[15] This analysis is related to Acemoglu (2005) which develops a model where a government raises taxes to spend on a mixture of transfers to the ruler and productivity enhancing public goods. Spending on public goods increases future tax revenues. Weak states where rulers have short time horizons spend too little on productive public goods while strong states where rules have too much security of tenure blunt accumulation incentives.

[16] `http://www.correlatesofwar.org/`.

The mean of this variable is 0.03 with a standard deviation of 0.73. The results in Tables 1 and 2 are robust to looking at different lags for this variable including using the average years of war up to 1900. The results also hold up if we use a dummy variable denoting whether a state has been involved in any external conflict before 1975 which guards against the influence of outliers such as France and Britain.

We also consider some measures of political institutions. The theory predicts that the inclusiveness of political institutions is one of the key factors shaping investments in state capacity. As in the case of war, we should thus consider the incidence of inclusive institutions in the past. Accordingly, we measure the share of years from 1800 (or independence) to 1975 that a country was democratic (as defined by a strictly positive value of the polity2 variable in the Polity IV data base).[17] Given the discussion in Section 4 of differences across democracies, we also measure the share of years the country was a parliamentary democracy.

Finally, our specification for each outcome variable includes a set of indicators for legal origins, as in many recent studies of institutions. Our model suggests a theoretical role for legal origins via the cost function $L(\cdot)$. If some legal origins affect the ease with which contracting can be done, we would expect this to affect investments in legal capacity. Perhaps less trivially, we would also expect the same legal origins to affect investments in tax systems in the same direction through the basic complementarity between the two forms of state capacity.

Table 1 considers legal capacity, measured via financial development and contract enforcement, as the dependent variable. The first column reports results for a common measure of financial development in the literature beginning with King and Levine (1993), namely the private credit to GDP ratio. We take the average of this variable over all years from 1975 onwards. As all other outcome variables in Tables 1 and 2, this measure is scaled to lie between 0 and 1, with higher values indicating higher state capacity. To rule out that results are driven by systematic differences across geography, we always include a set of regional fixed effects (eight regions) on the right hand side of the regression. An increase in the proportion of years up to 1975 that a country has been in an external conflict is strongly positively correlated with this measure of financial development. However, democracy does not seem to matter in a significant way. German and Scandinavian legal origins are positively correlated with private credit, but English and Socialist legal origin are not (French legal origin is the excluded category).

Column (2) looks at the country's rank in terms of access to credit, using the indicators from the World Bank's *Doing Business* web site.[18] Again, our

[17] `http://www.cidcm.umd.edu/polity/`.

[18] `http://www.doingbusiness.org/` The overall ranking is put together from four subcomponents: (i) a Legal Rights Index, which measures the degree to which collateral and bankruptcy laws facilitate lending, (ii) a Credit Information Index, which measures rules

incidence-of-war variable is positively correlated with legal capacity. Parliamentary democracy is also significantly correlated with higher legal capacity according to this measure (the sum of the two democracy variables is significantly different from zero). As in column (1), German and Scandinavian legal origin are positively correlated with the outcome. Column (3) also uses a variable from the *Doing Business* indicators this time the country's rank in terms of investor protection.[19] The findings are consistent with those in column (2).

Finally, we use a perceptions index of government anti-diversion policies from the International Country Risk Guide (ICRG), which itself is the sum of five different indexes, including contract enforcement and the rule of law. This index has been extensively used in the macro development literature (e.g., Hall and Jones, 1999, Acemoglu, Johnson and Robinson, 2001), as a measure of the protection of property rights. We take the average of this index from the early 1980s to the late 1990s. Even though the source of this variable is quite different from the others, it tells the same story in terms of war experience, parliamentary democracy and German and Scandinavian legal origins. To summarize, the patterns in the data appear entirely consistent with the determinants of contract enforcement and financial development suggested by the model.[20]

How does the fiscal capacity side of the story hold up? Fiscal capacity is more difficult to measure in terms of realized outcomes, since the model predicts that such capacity may not always be fully utilized. What matters are the past investments that make it possible to raise taxes. Governments in

affecting the scope, access, and quality of credit information, (iii) public credit registry coverage, and (iv) private credit bureau coverage. See Djankov, McLeish and Shelifer (2006) for further details.

[19] `http://www.doingbusiness.org/`

This ranking is assembled from four underlying indexes: (i) transparency of transactions (Extent of Disclosure Index) (ii) liability for self-dealing (Extent of Director Liability Index) (iii) shareholders' ability to sue officers and directors for misconduct (Ease of Shareholder Suit Index) (iv) strength of Investor Protection Index (the average of the three index). See Djankov, La Porta, Lopez-de-Silanes and Shleifer (2006) for details.

[20] These findings are also consistent with wars directly stimulating financial systems through issuance of public debt. Of course, this is not inconsistent with our general argument and ideas. Indeed, it reinforces the general complementarities that we are pointing out. However, it is another channel for war to have an impact on financial development. That being said, introducing more public debt would not necessarily lead to better *private* contract enforcement and *private* credit (in theory) except as an unintended consequence of public sector financial development.

countries with little fiscal capacity tend to use border taxes, such as tariffs, as the basis of their tax systems. They also tend to require less institutionalized structures of compliance compared to income taxation.

In Column (1) of Table 2, we use one minus the share of revenue from trade taxes as a first measure of fiscal capacity. This measure is based on IMF data and is expressed as an average from 1975 and onwards.[21] As predicted by the model, countries with a history of war are less reliant on trade taxes. German and Scandinavian legal origins are also correlated with greater fiscal capacity measured in this way. In column (2), we add in indirect taxation and find similar results, except that a high incidence of parliamentary democracy now also has the expected positive correlation.

In column (3), we proxy the level of fiscal capacity by having an extensive income tax systems, using the income tax to GDP ratio as our outcome measure. Again, we find past wars, past parliamentary democracy and German and Scandinavian legal origin to correlate with high fiscal capacity. Column (4) looks at overall taxes raised as a share of GDP. This outcome shows a similar pattern to the share of income taxes in GDP.

Putting the results in Tables 1 and 2 together, the historical incidence of war, the historical incidence of parliamentary democracy, and German and Scandinavian legal origins emerge as remarkably stable predictors of both legal and fiscal capacity. This is entirely in line with the predictions of our model, where both forms of state capacity have common origins in political institutions, the need to finance common interest public goods, and factors that shape the cost of investments. It is also worth noting that if we run regressions of the same kind as those reported in Tables 1 and 2, but with income per capita as the dependent variable, we obtain exactly the same patterns of sign and significance. While this preliminary exercise is suggestive, much remains to be done before we can claim to have identified causal effects in line with the predictions of our theory.

7 Concluding Comments

The historical experience of today's rich nations hint that the creation of state capacity to collect taxes and enforce contracts are key aspects of de-

[21] We thank Mick Keen for making the data on the structure of taxation used in Baunsgaard and Keen (2005) available to us. Their paper documents the sources for these variables.

velopment. Equally, the fortunes of many of today's poor countries indicate that state capacity cannot be taken for granted. This paper views investments in state capacity as purposive decisions reflecting circumstance and institutional structure. Our analysis has highlighted the factors that shape these decisions and a first inspection of the data suggests that the factors suggested by the theory do indeed correlate in the predicted way with various measures of legal and fiscal capacity. The theory brings together ideas from economic history, finance, development economics and political economics.

However, our paper takes only a first step in modeling the forces that shape investments in state capacity. Much remains to be done. Since the model uncovers clear links from political institutions to investments, it would be interesting to explore endogenous political change (and the emergence of democracy) in our framework. It is also clear that, even if war is an important source of common interest public goods, it cannot be assumed to evolve exogenously. Ideally, this would be explored in a model of multiple interdependent governments. But even in the rudimentary form developed here, our analysis offers a new perspective on how institutions shape development – the state capacities that we analyze are institutional features that typically evolve quite slowly. This may help to explain why historical patterns of prosperity appear to be highly persistent.

8 Appendix

Private optimal choices A borrower from group J can only borrow in period s by putting up a share, $c_s^J \leq 1$, of her wealth w^J as collateral. Denoting the amount borrowed by b_s^J, incentive compatibility implies the constraint (see further below):

$$b_s^J \leq p_s^J c_s^J w^J \ . \tag{17}$$

In addition to the notation in the text, let l_s denote the amount of lending provided by an individual, k_s the amount invested in a project, n_s the amount withheld from taxation in the informal sector, and let $d_s \in \{0, 1\}$ be a binary indicator for default on any amount borrowed. Since preferences are linear in private consumption (net income), we can then write the utility of an individual in group J and period s as

$$v_s^J = \alpha_s G_s + (1 - t_s^J)(r_I k_s^J - r_s b_s^J + r_s l_s^J) + (t_s^J - \tau_s) n_s^J + r_s (b_s^J - p_s^J c_s^J w^J) d_s^J. \tag{18}$$

The second term on the right-hand side is the net after-tax return from projects cum capital markets transactions, the third is the return to concealing income from tax in the informal sector, and the fourth the net gain from defaulting on borrowing.

Consider an individual choosing $\left(k_s^J, b_s^J, n_s^J, c_s^J, d_s^J, l_s^J\right) \geq 0$, in period s subject to the wealth constraint, $k_s^J + l_s^J \leq w^J + b_s^J$, the collateral constraint, $c_s^J \leq 1$, and the tax avoidance constraint, $n_s^J \leq w^J$. It is immediate that any individual with an investment opportunity would find it optimal to borrow and invest a large amount, and then default on his debt, i.e., set $d_s^J = 1$, as long as $b_s^J > p_s^J c_s^J w^J$. This formally motivates the upper bound on borrowing in (**??**). Moreover, as long as taxes exceed the critical level $t_s^J > \tau_s$, it is optimal to set $n_s^J = w^J$, i.e., put all projects in the informal sector. This formally motivates the upper bound on the tax rate

Imposing the no-tax-arbitrage and no-default constraints, the optimal choices for individuals with different rates of return are simple to characterize. High-return individuals for whom $r_I \geq r_s$ find it optimal to put up all their wealth as collateral, $c_s^J = 1$, invest a maximum amount $k_s^J = (1 + p_s^J) w^J$, and borrow $p_s^J w^J$ to enjoy the surplus of their project. Individuals with low returns are happy to lend at any market rate $r_s \geq r_L$ that makes up for their opportunity cost of foregone return. Putting this logic together yields equations (2) and (3) in the text.

Derivation of the investment objective Exploiting **Propositions 1-3,** we can define in a straightforward way the payoffs to each group depending on whether it has control over policy in period 2. If group J controls policy, its utility is:

$$w_J^J(\alpha_2, \tau_2, \pi_2) = \overline{\rho}\beta^J Y\left(\pi_2, \sigma^J, w^J\right) + \underline{\rho}\beta^K Y\left(\pi_2, \sigma^K, w^K\right) + \tag{19}$$

$$\begin{cases} \tau_2[(\alpha_2 - \overline{\rho})\,\beta^J Y\left(\pi_2, \sigma^J, w^J\right) + (\alpha_2 - \underline{\rho})\beta^K Y\left(\pi_2, \sigma^K, w^K\right)] & \text{if } \alpha_2 \geq \overline{\rho} \\ \tau_2(\overline{\rho} - \underline{\rho})\beta^K Y\left(\pi_2, \sigma^K, w^K\right) & \text{if } \alpha_2 < \overline{\rho}\ . \end{cases}$$

Since this expression is increasing in both τ_2 and π_2, the ruling group prefers access to greater taxable and legal capacity, other things equal. The corresponding payoff to group J when the other group K controls policy, calculated by applying group J's own welfare weights, is as follows:

$$w_K^J(\alpha_2, \tau_2, \pi_2) = \overline{\rho}\beta^J Y\left(\pi_2, \sigma^J, w^J\right) + \underline{\rho}\beta^K Y\left(\pi_s, \sigma^K, w^K\right) + \tag{20}$$

$$\begin{cases} \tau_2[(\alpha_2 - \overline{\rho})\,\beta^J Y\left(\pi_s, \sigma^J, w^J\right) + \left(\alpha_2 - \underline{\rho}\right)\beta^K Y\left(\pi_s, \sigma^K, w^K\right)] & \text{if } \alpha_2 \geq \overline{\rho} \\ \tau_2(\underline{\rho} - \overline{\rho})\beta^J Y\left(\pi_s, \sigma^K, w^K\right) & \text{if } \alpha_2 < \overline{\rho}\ . \end{cases}$$

These two expressions highlight a latent conflict of interest. When $\alpha_2 \geq \overline{\rho}$, no such conflict exists and the groups in power and out of power both want better state fiscal and legal capacity. When $\alpha_2 < \overline{\rho}$, instead, the group out of power is worse off when τ_2 is higher (cf. the negative term $(\underline{\rho} - \overline{\rho})$ in the last term of (20)), because taxes are used to redistribute income away from the non-ruling group towards the ruling group. While there is an obvious conflict of interest over fiscal capacity in this case, both groups continue to value improvements in legal capacity.

Let's assume that group J holds power in period 1. Define the expected payoff to this group with economic institutions (τ_2, π_2):

$$W^J(\tau_2, \pi_2) = \gamma^J E\left\{w_J^J(\alpha_2, \tau_2, \pi_2)\right\} + \left(1 - \gamma^J\right) E\left\{w_K^J(\alpha_2, \tau_2, \pi_2)\right\}\ .$$

Using (19) and (20), it is straightforward to derive expected utility (over the realization of α) as a function of τ_2, π_2 to group J:

$$\begin{aligned} W^J(\tau_2, \pi_2) \;=\; & \overline{\rho}\beta^J Y(\pi_2, \sigma^J, w^J) + \underline{\rho}\beta^K Y(\pi_2, \sigma^K, w^K) \\ & + \tau_2\left\{[\lambda_2^J - \overline{\rho}]\beta^J Y(\pi_2, \sigma^J, w^J) + [\lambda_2^J - \underline{\rho}]\beta^K Y(\pi_2, \sigma^K, w^K)\right\}, \end{aligned} \tag{21}$$

where:

$$\lambda_2^J = [1 - H(\overline{\rho})]\, E(\alpha_2 | \alpha_2 \geq \overline{\rho}) + H(\overline{\rho})\left[\gamma^J \overline{\rho} + \left(1 - \gamma^J\right)\underline{\rho}\right] \tag{22}$$

is the *expected* (marginal) value of period-2 public funds to group J. Observe that (one minus) the probability of turnover γ^J *only* enters the payoff function of the ruling group through λ_2^J.

Proof of Proposition 8 In order to prove the proposition, we define:

$$\eta_\tau = \frac{F_{\tau\tau}(\tau_2 - \tau_1)}{F_\tau} \text{ and } \eta_\pi = \frac{L_{\pi\pi}(\pi_2 - \pi_1)}{L_\pi}.$$

Next, we state

Assumption 1: For all $(\tau_2 - \tau_1) \in \left[0, F_\tau^{-1}\left(2r_H\Omega\left(1-\rho^J\right)\right)\right]$ and $(\pi_2 - \pi_1) \in [0, L_\pi^{-1}(\Omega r_H)]$, $\eta_\tau > \lambda(X)\frac{(\tau_2-\tau_1)}{1-\tau_1-(\tau_2-\tau_1)}$ and $\eta_\pi > \lambda(X)\frac{(\pi_2-\pi_1)}{1+\pi_1+(\pi_2-\pi_1)}\left[\frac{(1-\tau_1-(\tau_2-\tau_1))\left(1-\rho^J\right)}{\rho^J(1-\tau_1-(\tau_2-\tau_1))+\tau_1+(\tau_2-\tau_1)}\right]$.

Proof: The Hessian to the system made up by (10) and (11) is:

$$\begin{bmatrix} -L_{\pi\pi} & (r_H - r_L)\Omega\left(\lambda^J - \rho^J\right) \\ (r_H - r_L)\Omega\left(\lambda_2^J - \rho^J\right) & -F_{\tau\tau} \end{bmatrix}.$$

For an optimum, we require that the determinant of this matrix be positive. Using the first-order condition, this boils down to:

$$\eta_\pi\eta_\tau - [\lambda(\alpha_1)]^2\left[\frac{\left(1-\rho^J\right)(\tau_2-\tau_1)}{\rho^J + \tau_2\left(1-\rho^J\right)}\right]\cdot\frac{(\pi_2-\pi_1)}{(1+\pi_2)} > 0.$$

which is implied by Assumption 1. We now derive the comparative statics. The simplest way to do so is by using Cramer's rule, which implies:

$$\frac{d((\tau_2-\tau_1)}{d\rho^J} = \frac{\Omega r_H\left(-\eta_\pi\left[\frac{(1+\pi_2)}{(\pi_2-\pi_1)}\right] + \lambda(\alpha_1)\frac{(1-\tau_2)\left(\lambda_2^J-\rho^J\right)}{\rho^J+\tau_2\left(\lambda_2^J-\rho^J\right)}\right)}{F_\tau(\tau_2-\tau_1)(\tau_2-\tau_1)\left[\eta_\pi\eta_\tau - [\lambda(\alpha_1)]^2\left[\frac{(1-\rho^J)(\tau_2-\tau_1)}{\rho^J+\tau_2(1-\rho^J)}\right]\cdot\frac{(\pi_2-\pi_1)}{(1+\pi_2)}\right]},$$

an expression which is negative if:

$$\eta_\pi > \lambda(\alpha_1)\cdot\frac{(1-\tau_2)\left(\lambda_2^J-\rho^J\right)}{\rho^J+\tau_2\left(\lambda_2^J-\rho^J\right)}\cdot\left[\frac{(\pi_2-\pi_1)}{(1+\pi_2)}\right],$$

which is part two of Assumption 1. Now we have:

$$\frac{d(\pi_2-\pi_1)}{d\rho^J}=\frac{\Omega r_H\left(\left(1-\tau_2\right)\eta_\tau-\lambda\left(\alpha_1\right)\left(\tau_2-\tau_1\right)\right)}{L_\pi\left(\pi_2-\pi_1\right)\left(\pi_2-\pi_1\right)\left[\eta_\pi\eta_\tau-\left[\lambda\left(\alpha_1\right)\right]^2\left[\frac{(1-\rho^J)(\tau_2-\tau_1)}{\rho^J+\tau_2(1-\rho^J)}\right]\cdot\frac{(\pi_2-\pi_1)}{(1+\pi_2)}\right]},$$

which is positive if:

$$\eta_\tau>\lambda\left(X\right)\frac{\left(\tau_2-\tau_1\right)}{\left(1-\tau_2\right)},$$

which is also part of Assumption 1. ■

Proof of Proposition 9 First observe that if $\sigma^J\ell>\left[\sigma^J\hat{\ell}^J-\left(1-\sigma^J\right)\right]\eta\left(K\left(p^J,p^K\right)\right)>0$ (which always holds as $\sigma^J\to 1$, since $\eta\left(K\left(p^J,p^K\right)\right)<1$) then

$$\frac{\partial\hat{Y}^J\left(p^J,p^K\right)}{\partial p^J}=\left[\frac{\left[\left(1-\sigma^J\right)-\sigma^J\hat{\ell}^J\right]}{\ell}\eta\left(K\left(p^J,p^K\right)\right)+\sigma^J\right]Z_x\left(K^J\right)\cdot\beta^J\sigma^J w^J>0.$$

and

$$\frac{\partial\hat{Y}^J\left(p^J,p^K\right)}{\partial p^K}=\left[\frac{\left[\left(1-\sigma^J\right)-\sigma^J\hat{\ell}^J\right]}{\ell}\eta\left(K\left(p^J,p^K\right)\right)\right]Z_x\left(K^J\right)\cdot\beta^J\sigma^J w^J<0.$$

Thus there is a conflict of interest between creating property rights for the ruling group and the non-ruling group.

Suppose that $\alpha<\bar{\rho}$. Then the payoff function of ruling group J is

$$\bar{\rho}\beta^J\hat{Y}^J\left(p^K,p^J\right)+\underline{\rho}\beta^K\hat{Y}^K\left(p^K,p^J\right)+\tau\left[\beta^K\hat{Y}^K\left(p^K,p^J\right)\left(\bar{\rho}-\underline{\rho}\right)\right].$$

If either $\bar{\rho}-\underline{\rho}=0$ or $\tau=1$, this becomes:

$$\beta^J\hat{Y}^J\left(p^K,p^J\right)+\beta^K\hat{Y}^K\left(p^K,p^J\right).$$

Observe that:

$$\frac{\partial\left[\beta^J\hat{Y}^J\left(p^K,p^J\right)+\beta^K\hat{Y}^K\left(p^K,p^J\right)\right]}{\partial p^J}=\sigma^J Z_x\left(K^J\right)\beta^J\sigma^J w^J>0$$

so fiscal capacity is always used maximally. Now suppose that $\underline{\rho} = 0$ and $\tau = 0$, then the ruling party's payoff function is $\hat{Y}^J\left(p^K, p^J\right)$ which is strictly decreasing in p^K. Thus, $p^K = 0$. The result now follows by applying the intermediate value theorem.

Now turn to the case $\alpha \geq \bar{\rho}$. In this case the payoff function of the ruling group J is

$$\bar{\rho}\beta^J\hat{Y}^J\left(p^K, p^J\right)+\underline{\rho}\beta^K\hat{Y}^K\left(p^K, p^J\right)+\tau\left[\left(\alpha-\bar{\rho}\right)\beta^J\hat{Y}^J\left(p^K, p^J\right)+\left(\alpha-\underline{\rho}\right)\hat{Y}^K\left(p^K, p^J\right).\right]$$

Observe that in this case too, if $\tau = 1$ or $\bar{\rho} - \underline{\rho} = 0$ then this is proportional to:

$$\left[\beta^J\hat{Y}^J\left(p^K, p^J\right)+\beta^K\hat{Y}^K\left(p^K, p^J\right)\right]$$

which again implies full legal capacity is used. It is also the case that if $\tau = 0$ this payoff is again $\hat{Y}^J\left(p^K, p^J\right)$ and again the argument above applies. ■

Proof of Proposition 10 Assume an interior solution to the accumulation problem, defined by the first-order condition

$$-(1+\pi_1)Z_k[(w^J_{H,1}(1+\pi_1)](1-t^J_1)+(1+\pi_2)Z_k[(w^J_{H,2}(1+\pi_2)](1-E(t^J_2)) = 0\ .$$

The comparative statics satisfy

$$\frac{dw^J_{H,2}}{d\pi_2} = -\frac{Z_k(\cdot)\left[1-\eta\left(\cdot\right)\right]\left(1-E(t^J_2)\right)}{\Delta} > 0$$

and

$$\frac{dw^J_{H,2}}{d\tau_2} = \frac{Z_k(\cdot)(1+\pi_2)}{\Delta}\frac{dE(t^J_2)}{d\tau_2}\ ,$$

where $\Delta \equiv (1+\pi_1)^2 Z_{kk}[(w^J_{H,1}(1+\pi_1)](1-t^J_1)+(1+\pi_2)^2 Z_{kk}[(w^J_{H,2}(1+\pi_2)](1-E(t^J_2))$ is negative by the concavity of Z. Because we have

$$\frac{dE(t^J_2)}{d\tau_2} = [1-H(\overline{\rho})\gamma^J\frac{\beta^{-J}\sigma^{-J}y^{-J}_{H,2}}{\beta^J\sigma^J y^J_{H,2}}]\ ,$$

the second expression is negative provided that $H(\overline{\rho})$ is small enough which is equivalent to saying that the probability of providing public goods is high enough. ■

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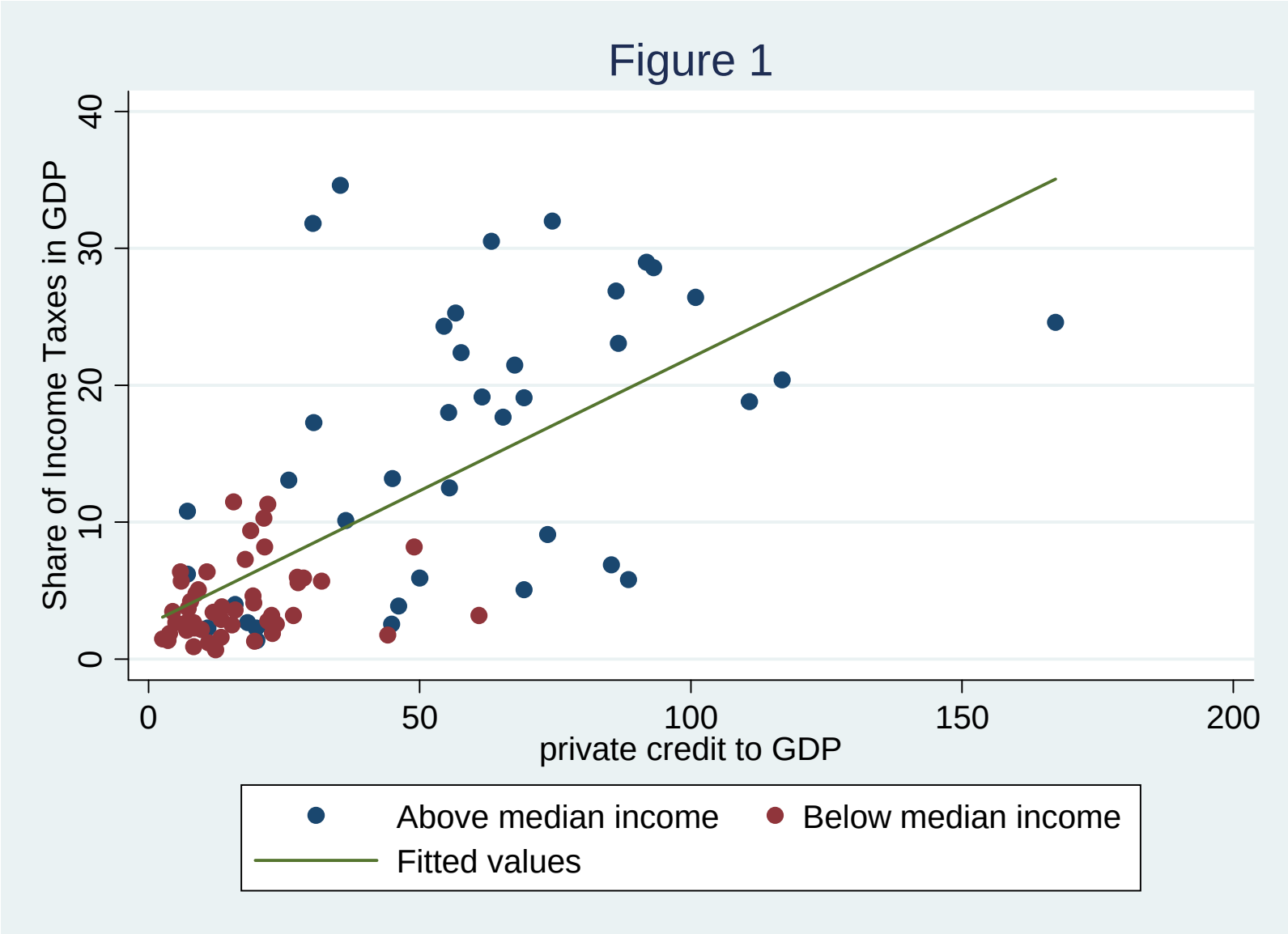
Figure 1
Share of Income Taxes in GDP
0
10
20
30
40
0
50
100
150
200
private credit to GDP
Above median income
Below median income
Fitted values

Table 1: Economic and Political Determinants of Legal Capacity

	(1) Private Credit to GDP	(2) Ease of Access to Credit (country rank)	(3) Investor Protection (country rank)	(4) Index of Government Anti-diversion Policies
Incidence of External Conflict up to 1975	0.573*** (0.138)	0.676*** (0.191)	0.436*** (0.147)	0.689*** (0.143)
Incidence of Democracy up to 1975	0.102 (0.079)	0.034 (0.130)	- 0.182 (0.121)	0.068 (0.060)
Incidence of Parliamentary Democracy up to 1975	– 0.037 (0.071)	0.219 (0.146)	0.396*** (0.126)	0.138** (0.067)
English Legal Origin	– 0.004 (0.038)	0.099 (0.073)	0.064 (0.070)	– 0.003 (0.051)
Socialist Legal Origin	0.000 (0.000)	– 0.180 (0.153)	– 0.117 (0.154)	0.008 (0.066)
German Legal Origin	0.396*** (0.094)	0.401*** (0.068)	– 0.011 (0.109)	0.290*** (0.055)
Scandinavian Legal Origin	0.164*** (0.033)	0.405*** (0.061)	0.221** (0.097)	0.362*** (0.057)
Observations	94	127	125	117
R-squared	0.601	0.480	0.314	0.603

Robust standard errors in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.
All specifications include regional fixed effects (for eight regions).

Table 2: Economic and Political Determinants of Fiscal Capacity

	(1) One Minus Share of Trade Taxes in Total Taxes	(2) One Minus Share of Trade and Indirect Taxes in Total Taxes	(3) Share of Income Taxes in GDP	(4) Share of Taxes in GDP
Incidence of External Conflict up to 1975	0.921*** (0.229)	0.683*** (0.201)	0.747*** (0.246)	0.678*** (0.211)
Incidence of Democracy up to 1975	0.005 (0.085)	– 0.037 (0.096)	0.057 (0.062)	0.097 (0.064)
Incidence of Parliamentary Democracy up to 1975	0.123 (0.086)	0.208** (0.094)	0.231*** (0.074)	0.166** (0.069)
English Legal Origin	– 0.013 (0.069)	- 0.012 (0.061)	– 0.015 (0.056)	0.013 (0.051)
Socialist Legal Origin	0.051 (0.095)	– 0.332*** (0.084)	– 0.155** (0.065)	– 0.110 (0.082)
German Legal Origin	0.283*** (0.064)	0.290*** (0.093)	0.295*** (0.084)	0.206*** (0.065)
Scandinavian Legal Origin	0.333*** (0.068)	0.195** (0.078)	0.364** (0.141)	0.363*** (0.092)
Observations	104	104	104	104
R-squared	0.412	0.435	0.628	0.639

Robust standard errors in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%
All specifications include regional fixed effects (for eight regions).