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 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 illustrates that common interest public goods, such as fighting wars, as well as political stability and inclusive political institutions are conducive to building state capacity. Premilinary empirical evidence show that the correlations found in cross-country data are consistent with the theory.

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1 Introduction

Economic theory generally presumes sufficient institutions to sustain a market economy and to tax the citizens. The Arrow-Debreu model presupposes a competent government to enforce contracts and laws. Similarly, the study of optimal taxation acknowledges the existence of informational constraints, but makes unstated assumptions about a bureaucracy able to enforce any tax policy that respects those constraints. The same is generally true for positive analyses how the power to tax or to regulate is chosen in political equilibrium as shaped by representative institutions. However, this starting point bypasses a set of fundamental issues that cannot be taken for granted in many states around the world, namely which way state capacity in taxation and market supporting institutions is created.

The standard approach in economics contrasts markedly with the perspectives on the origins of the state taken by historians. These rarely take for granted the ability of the state to tax its citizens and instead see the evolution of fiscal and legal institutions as a central fact to be explained.[1] A particularly intriguing argument has been provided by political historians (see, e.g., T-qpp. seetflfie egucW-AKA7pfiM""-MWI

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 development 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?

To tackle these theoretical, historical, and empirical issues, we need a framework where regulation of market supporting measures and tax rates are endogenous "policy choices". It is realistic to assume some inertia in these choices, however, due to "economic institutions" – the state's legal and fiscal capacity – inherited from the past. It is also realistic that the current policy choices reflect political institutions inherited from the past. In this paper, we propose a model to deal with these issues. We seek general insights about the relationships between taxes and property rights, redistribution vs. the provision of public goods, income levels, and political regimes. The key feature of our model is to treat the state's legal and fiscal capacity as resulting from ex ante investments under uncertainty. These investments in economic institutions constrain the ex post choices of how well to protect the property rights and how heavily to tax different groups in society.

The ideas developed in this paper are motivated in part by the empirical observation that measures of the power to tax and financial development are positively correlated with each other as well as with measures of income per capita. This illustrated in Figure 1 which graphs the share of government revenue raised from income taxes as a share of GDP against the average private credit to GDP ratio both measured in 1995. The red dots are for countries with below median income (per capita) and the blue represent those with above median income (per capita). We also put a regression line on the chart to emphasize that these are positive correlated. The poorer countries tend to be scattered to the south west in the graph while those with higher income per capita cluster in the north east. Our model will emphasize that nothing causal can be read into these patterns. However, they run counter to simplistic notions that small government is a precondition for the emergence of rich and developed nations. Rather, the cross country patterns suggest that higher taxation and financial development may have common underlying causes.

Beyond the theoretical, histiorcal and empirical issues discussed above, our paper is related to several strands of literature. In particular, a number of researchers have sought to explain the institutions supporting 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 literature the approach of treating 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 may not find it optimal to provide maximum efficiency of markets and further its own selfish interests through redistributive taxation (Acemoglu, 2006 considers the spillovers to regulatory policies of the state's capacity to tax, but treats the latter as exogenous). One of our key findings is indeed 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 the influence on institution-building of factors such as political instability, conflict and polarization.

We formulate a simple two-period model where the ruler in each time period makes policy decisions shaping the protection of property rights and the taxation of income, and where these policy choices are constrained by past investments in legal and fiscal capacity.[2] Section 2 studies optimal private decisions in each period, for given policies. Then, in Section 3 we analyze optimal policy choices in each period for given economic institutions, by a Utilitarian planner as well as politically motivated governments. 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, which shed light on the economic and political determinants of legal and fiscal capacity. We also spell out the implications of our theory for economic growth. Section 5 considers four extensions of our basic model, 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

[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 (Persson and Svensson. 1989).

consistent with the main predictions of our model. Section 7 concludes.

2 Model and Optimal Private Choices

We study a two-period model with two government policy instruments in each period. Earlier investments in economic institutions – legal and fiscal capacity – constrain the policy choices, how well to enforce property rights supporting private contracts, and how much to tax output, respectively. The policy choices, in turn, shape private economic behavior. In this section we set up the model and study equilibrium private behavior. In subsequent sections, we use the model to study optimal policy choices for given economic institutions, and go on to the equilibrium investments in legal and fiscal capacity.

Time structure There are two periods $s = 1, 2$. Markets are open in both time periods and consumers lack any ability to 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.

Group structure There are two groups, $J = A, B$ where 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 level of wealth w^J.

Production opportunities Individuals not only differ by their observable group membership, but also by their unobservable production opportunity type, indexed by I. Thus, each person can engage in entrepreneurial projects, which come in two types with different (gross) returns, $r_{I,s} \in \{r_L, r_H\}$ and $r_H > r_L$. (Alternatively, think about the L types as having access to a simple storage technology with return r_L). Each potential entrepreneur has access only to high or low return type projects, but these types cannot be observed or verified by anybody. We denote the share of group J agents with high returns by σ^J (the same in each time period), such that type H individuals in group J make 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 outside borrowing. Prospective entrepreneurs borrow from lenders in a competitive capital market. To prevent default, borrowing requires collateral. 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. Contracts between borrowers and lenders are upheld by the legal system. However, only a share $p_s^J \leq 1$ of collateral serves as effective collateral. Thus we can think of p_s^J as an index for the enforcement of property rights, a policy instrument which is chosen by the government before private choices are made. We assume that lenders (and borrowers) are risk-neutral and interpret p_s^J as the probability with which the lender can gain access to the collateral in case of default. (In our setting, property rights thus refer to protection against risk of expropriation by other private agents, not expropriation by the government, which is ruled out by assumption.)

As collateralized investment will earn no less than the (gross) market return r_s, a borrower from group J in period s can only borrow as much as she will (be expected to) repay at the going (gross) rate r_s. Denoting the amount borrowed by b_s^J, incentive compatibility implies the constraint (see further below):

$$b_s^J \leq p_s^J c_s^J w^J \ . \tag{1}$$

We will say that property-rights protection is better for group J, when p_s^J is higher, because this allows a group member to borrow a larger amount for each piece of collateral . Such protection can be differentiated by observable group J, but not by unobservable type I. We will say that property rights are universal if $p_s^A = p_s^B$. This is like the principle of the rule of law, where everyone in the economy has equal access to contract enforcement.

Finally, the government's ex post regulatory 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". 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 $L_\pi(0) > 0$.

The level of 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 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, but not whether the output has been derived from a high or low return project or through lending. Think about the two observable groups J as producing different goods, or the same good at different places. Under these observability assumptions, 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 there is equal taxation of both groups: $t_s^A = t_s^B$. To allow for redistribution in the simplest possible way, we allow for negative tax rates.

High taxation is constrained by the fact that an 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. Clearly, this implies that the tax rates in period s must satisfy $t_s^J \leq \tau_s$ (see further below). As with legal capacity, these non-taxable fractions are determined by investments. Let τ_1 be the initial (i.e., period 1) value 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 $F_\tau(0) > 0$. We could think that the cost of investments in fiscal capacity is systematically going down as an economy develops.

Apart from the need to invest in legal and fiscal capacity, there is an additional public-goods (non-transfer) motive for raising taxes.. This is represented by a linear payoff, $\alpha_s G_s$, common to all individuals. We assume that α_s has a distribution H of possible realizations distributed on $[0, X]$ where $X > 1$. The shock is assumed to be *iid* over time. The realized value of α_s is known when taxes t_s^J are set. But when investments in fiscal capacity take place 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.

Individual choices In addition to the earlier notation, 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. Assuming that preferences are linear in private consumption (net income),

we can then write the utility of an individual in group J and period s as

$$v_s^J = \alpha_s G_s + (1 - t_s^J)(r_I k_s^J - r_s b_s^J + r_s l_s^J) + (t_s^J - \tau_s) n_s^J + r_s (b_s^J - p_s^J c_s^J w^J) d_s^J. \quad (2)$$

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 (1). 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.

Capital market equilibrium Optimal individual choices imply horizontal demands for borrowing up to the point $\sigma^J \beta^J p_s^J w^J$ by high-return individuals in group J, and 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:

$$(\sigma^A \beta^A p_s^A w^A + \sigma^B \beta^B p_s^B w^B) = l_s((1 - \sigma^A)\beta^A w^A + (1 - \sigma^B)\beta^B w^B) \ . \quad (3)$$

In section 5.3, we discuss the case when the maximum supply of lending is not large enough to fund all high-return projects. This is one instance

where it may pay for a group with disproportionate political power to grant less than full-capacity property-rights protection to the other group, so as to boost its own income.

Indirect utilities The optimal individual choices discussed above imply indirect utility functions over policy. For the two types, $I = H, L$ in group J, indirect utility can be written:

$$v^J_{H,s}(t^J_s, p^J_s, G_s) = \alpha_s G_s + (1 - t^J_s)(r_H + p^J_s(r_H - r_L))w^J \tag{4}$$

and

$$v^J_{L,s}(t^J_s, p^J_s, G_s) = \alpha_s G_s + (1 - t^J_s) r_L w^J \ . \tag{5}$$

Of course, in equilibrium, indirect utility may also depend on policies towards the other group, $t^K_s, p^K_s, K \neq J$ and the economic institutions $\{\tau_s, \pi_s\}$, but this dependence is only indirect through equilibrium government choices.

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

$$Y(p^J_s, \sigma^J, w^J) = \{\sigma^J(1 + p^J_s)(r_H - r_L) + r_L\} w^J \ . \tag{6}$$

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

$$\sum_J t^J_1 \beta^J Y(p^J_1, \sigma^J, w^J) = G_1 + [L(\pi_2 - \pi_1) + F(\tau_2 - \tau_1)] \tag{7}$$

in period 1, and

$$\sum_J t^J_2 \beta^J Y(p^J_2, \sigma^J, w^J) = G_2 \tag{8}$$

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

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

$$\overline{\rho} = \frac{\phi_A^A}{\beta^A} = \frac{\phi_B^B}{\beta^B} \geq \underline{\rho} = \frac{\phi_A^B}{\beta^B} = \frac{\phi_B^A}{\beta^A}$$

This says that each group attaches the same relative weight to its own group and 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.

Later on, 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. We can also represent greater political instability by varying the value of γ^J.

Timing The economy starts out with an initial level of 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 policy maker 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 (7) 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 policy maker 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 (8) 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. Because we have already described private-sector behavior in each period, we can focus on government behavior from now on.

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 separately from the investment decisions in period 1. Note that we can write the aggregate utility of group J in period s as

$$\beta^J[\alpha_s G_s + \left(1 - t_s^J\right) Y(p_s^J, \sigma^J, w^J)] \ . \tag{9}$$

Let group J be in power and group K be out of power. Then, the policy vector $\left\{t_s^J, t_s^K, p_s^J, p_s^K, G\right\}$ maximizes the objective:

$$[\alpha_s G_s + \overline{\rho}\left(1 - t_s^J\right) \beta^J Y(p_s^J, \sigma^J, w^J) + \underline{\rho}\left(1 - t_s^K\right) \beta^K Y(p_s^K, \sigma^K, w^K)] \ , \tag{10}$$

for given α_s subject to the government budget constraint (7) or (8), 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 $\left(t_s^A, t_s^B\right)$. Thus legal capacity is always fully utilized ex post. This is really an application of the famous Diamond and Mirrlees production efficiency result. This result is a useful benchmark case, but in Section 5 we discuss a set of conditions under which it fails to hold. As will be clear already in

another no need to set any taxes at all (although the levels **Proposition 2** remain weakly optimal in this case).

We now turn to the case where public goods are very 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

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

In this case, taxes are used solely to finance public goods (there are no transfers in any period). The only difference is the need to set aside some revenues in period 1 to pay for investments in state capacity, which implies less public goods provision.

Together **Propositions 2** and **3** reveal the exact sense in which political control with $\overline{\rho} > \underline{\rho}$ distorts policy outcomes in our model, compared to a Utilitarian outcome. First, there is a *taxation distortion,* whereby one group always pays maximal taxes to fund redistribution, whereas the Utilitarian criterion does not favor such redistribution. Second, there is 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. To illustrate, assume that H is uniform on the interval $[0, X]$ Then:

$$H(\overline{\rho}) = \begin{cases} \frac{\overline{\rho}}{X} & \text{if } \overline{\rho} < X \\ 1 & \text{otherwise .} \end{cases} ,$$

which should be compared to non-provision with probability $1/X$ with a Utilitarian objective.

4 Optimal Investment in State Capacity

We now turn to the investments in economic institutions in period 1. These decisions are made by the ruling group in period 1, under uncertainty about future political control, γ_2, and value of public goods, α_2. To characterize the optimal investments, we need some further results and notation.

4.1 Preliminaries

The results in **Propositions 1-3** can be used in a straightforward way to express the payoffs to each group depending on whether it has control over policy in period 2. If group J controls policy, its utility is:

$$w_J^J(\alpha_2, \tau_2, \pi_2) = \overline{\rho}\beta^J Y\left(\pi_2, \sigma^J, w^J\right) + \underline{\rho}\beta^K Y\left(\pi_2, \sigma^K, w^K\right) + \tag{11}$$

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

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:

$$w_K^J(\alpha_2, \tau_2, \pi_2) = \overline{\rho}\beta^J Y\left(\pi_2, \sigma^J, w^J\right) + \underline{\rho}\beta^K Y\left(\pi_s, \sigma^K, w^K\right) + \tag{12}$$

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

These two expressions highlight an important economic effect, which will play a crucial role in the argument to follow. When $\alpha_2 \geq \overline{\rho}$, there is no conflict of interest and the groups in power and out of power both want to have better state fiscal and legal capacity. The key difference lies in the case where $\alpha_2 < \overline{\rho}$. In this case, 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 (12)). The reason is that 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 (11) and (12), it is straightforward to derive:

$$\begin{aligned} W^J(\tau_2, \pi_2) \ = \ & \overline{\rho}\beta^J Y(\pi_2, \sigma^J, w^J) + \underline{\rho}\beta^K Y(\pi_2, \sigma^K, w^K) \\ & + \tau_2 \left\{[\lambda_2^J - \overline{\rho}]\beta^J Y(\pi_2, \sigma^J, w^J) + [\lambda_2^J - \underline{\rho}]\beta^K Y(\pi_2, \sigma^K, w^K)\right\}, \end{aligned} \tag{13}$$

where:

$$\lambda_2^J = [1 - H(\overline{\rho})] E(\alpha_2 | \alpha_2 \geq \overline{\rho}) + H(\overline{\rho})\left[\gamma^J \overline{\rho} + \left(1 - \gamma^J\right)\underline{\rho}\right] \tag{14}$$

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 public funds in period 1.

The first-order conditions for investing in institutions can be written as:

$$\begin{aligned} [\rho^J + \tau_2(\lambda_2^J - \rho^J)](r_H - r_L)\Omega \ &\leqslant \ \lambda(\alpha_1) L_\pi(\pi_2 - \pi_1) \\ \text{c.s. } \pi_2 - \pi_1 \ &\geqslant \ 0 \end{aligned} \tag{15}$$

and

$$\begin{aligned} (\lambda_2^J - \rho^J)\left[(1 + \pi_2)(r_H - r_L)\Omega + r_L\left(\beta^J w^J + \beta^K w^K\right)\right] \ &\leqslant \ \lambda(\alpha_1) F_\tau(\tau_2 - \tau_1) \\ \text{c.s. } \tau_2 - \tau_1 \ &\geqslant \ 0 \ , \end{aligned} \tag{16}$$

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. Note that ω^J and ω^K reflect each groups economic power in terms of investment opportunities. Conditions (15) and (16) summarize all the forces that shape

4.2 Determinants of State Capacity

What does the model say about investment in institutions? The results are developed in two steps. First, we prove results that hold under very general conditions and regardless of which group is in power, exploiting the complementarity of investment decisions which imply that the payoff function being maximized is super-modular. We can then use standard results from the literature on monotone comparative statics.[3] 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 LHS of (16) or (15).

Second, we derive more specific results on how the distribution of economic and political power affect institution building. These latter results 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 (16). 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 (15). Note that **Proposition 4** applies, even if the increased wealth and trading opportunities were to apply exclusively to the other group. 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 that the size of the public sector, as well as measures of the protection of property

[3] 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.

rights are positively correlated with income both across and within countries. They are also consistent, e.g., with the argument by Rajan and Zingales (2003) that we should expect financial development to be positively correlated with openness to international trade, because this expands the returns to reallocating capital. These authors present historical evidence, showing 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 increasing again in the last 30-40 years. (The non-formalized theory presented 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). We return to the relation between financial development and income in Sections 4.3 and 5.4 below.

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

Proposition 5 *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 $\lambda(\alpha_1)$.*

The first result can be interpreted as a version of Tilly's (1990) hypothesis on the importance of war in shaping 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 top 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 one demand for public goods is great, then public funds are at a premium and investments will be lower. The greatest incentive to invest arises when $\lambda(\alpha_1) = \overline{\rho}$, i.e., the current situation is one where there is redistribution.

We turn next to 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) increases the expected value of public funds in future. This is because the chance 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 lower if the political system protects the non-ruling group, i.e., if $\overline{\rho} - \underline{\rho}$ is close to zero. The effect works mainly through the demand for fiscal capacity. 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 or a high degree of ethnic or linguistic conflict.

A testable prediction is thus that we should observe less developed economic institutions in politically instable 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 are saying here is that such divisions interact with political instability in curtailing investments in legal and fiscal capacity. We know of no empirical study of these issues.

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 and ambiguous, 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 a institutionalized polarization result, as we have in mind a measure of how consensual are the 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 the observation that under the assumption $\beta^J = \omega^J = \gamma^J$, there is no 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 that $\lambda_2^J =$

$\int_{\overline{\rho}}^{X} \alpha_2 dH(\alpha) + H(\overline{\rho})$, which is independent of J. The effect of an increase in $\overline{\rho}$ on λ_2^J is then given by:

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

The intuition is that increasing polarization makes the outcome in the redistributive policy regime look worse for the investing group.

A long tradition in political science, e.g., Lijphart (1999) consider proportional electoral systems as more consensual than proportional 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.

Finally, we would like to say something specific about how the distribution of economic power impinges on investments in economic institutions. To do this, we simplify the model and set $r_L = 0$. We then look at the effect of an increase in the share of the wealth belonging to group J, as represented by an increase in ω^J and a concomitant reduction in ω^K. With a few regulatory conditions, we so indeed get an expected result.

We now have:

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. Essentially, 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.

Proposition 8 speaks about the effects of the wealth distribution between the groups in and out of power. It suggests that 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, we expect 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).

Taken together, **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

So far, we have considered the effect of various parameters on state capacity. The simple structure of the model also makes it easy to work out its implications for economic growth. Define economic growth in the conventional way, as the proportional increase in national income from period 1 to period 2. Using the definition of per capita (group) outputs in (6) and the results in Proposition 1, a little algebra establishes:

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

Thus, the growth rate is directly proportional to the investments in legal capacity. Since there is no private accumulation, getting markets to work better – achieving higher TFP – is the only source of growth in the model. There are thus strong reasons to see a positive correlation between improvements of market-supporting economic institutions and income growth.

Legal capacity in our model can be said to measure financial development, because the amount of private credit is 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 indeed can cause growth. But, as we have seen in **Proposition 4**, higher income generally raises the incentives to invest in legal capacity leading to financial deepening.

How about fiscal institutions and growth? The complementarity between fiscal and legal capacity delivers a set of clear results. Specifically, if higher investment in legal capacity is driven by any of the determinants emphasized in Propositions 4-7, we expect it go hand in hand with higher investments in 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.

We think these observations are interesting, in relief to 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., Levine and King, 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 relation. 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 in a situation where there was alternation in power $\left(\gamma^J < 1\right)$ and a whole sequence of realizations of α. This can be studied formally by extending the two period model to consider an infinite time horizon and studying the Markov perfect equilibria of the ensuing game. The situation studied above 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 approach the issue by characterizing the level of fiscal and legal capacity at which neither group would wish to make a further investment in state capacity. We would expect the economy to converge to this outcome eventually as for levels below these, at least one group would wish to make further improvements in state capacity.

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

$$\left(\rho^J + \tau_J^* \left[\lambda_2^J - \rho^J\right]\right) \left(r_H - r_L\right) \Omega = \overline{\rho} L_\tau \left(0\right) \tag{18}$$

and

$$\left[\lambda_2^J - \rho^J\right] \left[\left[1 + \pi_J^*\right] \left(r_H - r_L\right) \Omega + r_L \left(\beta^J w^J + \beta^K w^K\right)\right] = \overline{\rho} F_\pi \left(0\right) \ . \tag{19}$$

By multiplying the costs by $\bar{\rho}$, we are imagining a situation where 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. The first is where one group prefers more fiscal and the other more legal capacity. To see when this is true, observe that:

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

and

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

Thus, this will tend to be the case when $\gamma^J \simeq \frac{1}{2}$ and political control fluctuates evenly between the groups and/or $H(\overline{\rho}) \simeq 0$ realizations of α make it highly likely that there will be provision of public goods. In this case, the distribution of investment demands will determine which group prefers more fiscal and which more legal capacity.

Suppose that $H\left(\overline{\rho}\right)\left(2\gamma^J - 1\right) \simeq 0$ and $\omega^A > 1/2$. Then $\pi_A^* > \pi_B^*$ and $\tau_A^* < \tau_B^*$. In this case, we will eventually expect state capacity to evolve so group A gWU□□O

This can be positive for at most one group. Hence, investment in fiscal and legal capacity are no longer complements. In particular, the group for which $\gamma^J < \omega^J$, i.e., its political power is lower than its economic power will not wish to invest in fiscal capacity at all. This makes sense – the only role for taxation is to redistribute and on average this will be away from group J towards group K. To the extent that there are past investments in fiscal capacity, this will also tend to lower investments in legal capacity. This is because the benefits of legal capacity will tend to accrue to other groups. This will lead to a lop-sided development of state capacity since there will only be investment in state capacity when group K is in power. This further illustrates why having demand for common public goods is a boost to development of state capacity.

5.3 Labor Markets and Quasi-Rents

In the above analysis, it was always optimal to fully utilize legal capacity – in fact to do so was Pareto superior. In this section, we show that pecuniary externalities – factor price effects in the language of Acemoglu (2006) – may lead to one group not been permitted to fully utilize the legal capacity available to it. We show that this is more likely to happen when there is a high level of polarization in the political institutions 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.[4] 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 having effective tax systems 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 in the economy as a group with greater productive capital may prefer to have lower wages, which is achieved by denying the other group full access to the services of the legal system.

Suppose now that $r_L = 0$ and with a fraction σ^J have the opportunity to develop a project using labor, ℓ^J, and capital using a constant returns to scale

[4] 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.

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 $k^J/\ell^J = w^J\left(1+p^J\right)/\ell^J$.[5] 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 $\ell = \beta^A\left(1-\sigma^A\right) + \beta^B\left(1-\sigma^B\right)$ denotes the aggregate supply of labor. As suggested by this expression, we assume that agents who do not develop projects become laborers and that each individuals is endowed with one unit of labor which they supply inelastically.

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

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

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 just formalizes the observation the wage rate is higher when more capital is productively employed in the economy.

The per capita income of a "representative member" of group J when the levels of legal enforcement offered is p^J for them and p^K for the other group is:

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

Compared to the baseline model, the main observation is that group J's income depend on group K's property rights, p^K, through the endogenous wage rate. If group J is a net demander of labor, then it will prefer a lower wage rate which can be achieved if group K has less access to legal services.

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

[5] 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 $\chi \in [0,1]$.

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

There are two key insights here. First, if there is no institutionalized polarization, $((\bar{\rho} - \underline{\rho}) = 0)$ we are guaranteed full use of legal capacity ex post. Second, if political control matters $((\bar{\rho} - \underline{\rho}) > 0)$ and taxable capacity is low, then it is optimal for a ruling group to deny the use of the legal system to the other group completely. This is because of a pecuniary externality – the ruling group loses out by granting full property rights, because this 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.

We can show that an analogous mechanism applies when we reverse the assumption in Section 2 that the supply of capital by agents with low returns is always large enough to satisfy the maximum 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.

The arguments in this section illustrate a further benefit to countries that have developed effective fiscal capacity as they are more likely to pursue production efficient allocations of market supporting policies. This logic is very much in the spirit of Diamond and Mirrlees (1971)'s case for production efficiency. In general, we would expect the existence of underutilized legal capacity ex post to reduce incentives to invest in legal capacity ex ante.

5.4 Endogenous Private Accumulation

The analysis in the paper abstracts from private accumulation of wealth and – as a result – from negative incentive effects of fiscal capacity through higher expected taxes. In this subsection, we demonstrate what happens when private accumulation is added to the model in a very simple way. We show that building fiscal capacity now has a "standard" negative effect on economic growth, while building legal capacity has an additional positive effect on growth through its affect on accumulation.

The simplest way to extend the model is to assume that private accumulation takes place between stages 1 and 2 in the previous model. Assume, then, that individuals who have a high-return project at stage 1 now have access

to an increasing and concave production technology in both time periods. This is denoted by:

$$y^J_{H,s} = Z(k^J_{H,s}) \ ,$$

with $\eta = -\frac{Z_{xx}(x)x}{Z_x(x)} \in [0,1]$, and where $k^J_{H,s} = (1+p^J_s)w^J_s$. Thus having a 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

$$w^J_{H,1} \leqslant w^J, \ \text{ and } \ w^J_{H,2} = w^J + (w^J - w^J_{H,1}) \ . \tag{20}$$

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

With this timing, the government choices are exactly as described in Sections 3 and 4 above, since private choices have already been made at the time that period two state capacity is chosen. High-return individuals make their accumulation decisions under rational expectations about government choices which they take as exogenous. Let $E\left(t^J_2\right)$ be the expected period two taxes faced by a member of group J. Then the accumulation decisions of high-return individuals will solve the following problem

$$\text{Max}_{w^J_{H,2}} \ Z[(w^J_{H,1}(1+\pi_1)](1-t^J_1) + Z[w^J_{H,2}(1+\pi_2)]\left(1-E(t^J_2)\right) \ ,$$

subject to (20).

We are interested in how this depends on τ_2 and π_2.We can summarize the outcomes as follows:

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

The first part confirms that investments in legal capacity unambiguously improve private investment incentives. This is because future wealth can be "collateralized", generating high investment returns.[6] The second effect is standard effect of taxation on incentives. This is relevant when public goods are valuable enough, since no group will the face a lower expected tax as fiscal capacity expands, due to more redistribution.

[6] 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.

How does this 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 $w^J_{H,2} = w^J_{H,1} = w^J$. This yields:

$$\frac{Y_2 - Y_1}{Y_1} \simeq \frac{\sum_J \beta^J \sigma^J Z_k[(1+\pi_1)w^J][w^J(\pi_2 - \pi_1) + (1+\pi_1)2(w^J_{H,2} - w^J)]}{Y_1} \tag{21}$$

The first term in (21) represents the effect of improved institutions on growth for a given level of capital. The second term is a "capital accumulation effect" which reflects the feedback of improvements in state capacity on private accumulation decisions.

Combining this expression 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.*

This shows how the conventional the expansion of 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 in the model, so we will 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.

6 A First Look at the Data

A central implication of the model presented in this paper is that the development of fiscal systems and market supporting legal institutions (particularly those that foster financial development) should be considered as jointly endogenous variables. In this section, we take a first look at data on measures

of financial development, contract enforcement and tax structure. We explore correlations between these outcome variables and their economic and political determinants as 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 emergence of 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.[7]

We also look at some measures of political institutions. The theory gives a key role to the inclusiveness of political institutions as factors that shape investment in state capacity. As in the case of war, we should consider the incidence of inclusive institutions in the past. Thus, 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 PolityIV data base).[8] Picking up on the idea mentioned 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 also includes a set of indicators for legal origins, which appears 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 in the model between the two forms of state capacity.

Table 1 considers legal capacity, as measured by financial development and contract enforcement, as the dependent variable. The first column reports results when the dependent variable is 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 from 1975. As all the 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

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

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

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 positively and strongly 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.[9] Again, our incidence-of-war variable is positively correlated with the measure of legal capacity. Parliamentary democracy is correlated with an improvement in performance on 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 contry's rank in terms of investor protection.[10] 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 apppear entirely

[9] `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 affecting the scope, access, and quality of credit information, (iii) public credit registry coverage, and (iv) private credit bureau coverage. See Djankov et al (2006) for further details.

[10] 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).

consistent with the determinants of contract enforcement and financial development suggested by the model.[11]

How does the other, fiscal side of the story hold up? Fiscal capacity is a little more difficult to measure since the model predicts that fiscal capacity may not be fully utilized at all points in time. What matters are the past investments that make it possible to raise taxes. Governments in 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.[12] As expected, 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.

High levels of fiscal capacity are arguably measured by having successful income tax systems. In column (3), we use the income tax to GDP ratio as our measure of fiscal capacity. Again, we find that past wars war correlate with greater fiscal capacity. Past Parliamentary democracy also emerges as important, as does German and Scandinavian legal origin. 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 these results together, the historical incidence of war and of Parliamentary democracy, and German and Scandinavian legal origins are 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

[11] These findings are consistent with wars also having a direct stimulus to financial systems through issuance of public debt. Of course, this is not inconsistent with our argument or general 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 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.

[12] 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.

interest public goods, and factors that shape the cost of investments. It is also worth noting that if we run regressions of the kind reported in Tables 1 and 2, but with income per capita as the dependent variable, then we obtain exactly the same patterns of sign and significance. While this is suggestive, much obviously remains to do before we can claim to have identified causal effects in line with the predictions of our theory.

7 Concluding Comments

We have studied the incentives for creating state capacity to collect taxes and enforce contracts. The historical experience of now developed countries has pointed to the creation of such capacities as key aspects of state development. Equally, the fortunes of many contemporary developing countries illustrate that state capacity cannot be taken for granted. This paper views investments in state capacity as purposive decisions reflecting circumstance and institutional structure. The 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 positively correlate with various measures of legal and fiscal capacity.

The paper contributes to broad debates about how governments can support the development process. The analysis gives a perspective on how institutions shape development: the state capacities that we model are features of states that typically evolve quite slowly. This may help explain why historical patterns of prosperity appear to be highly persistent.

8 Appendix

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 (15) and (16) 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:

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

which is positive if:

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

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

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

and

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

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:

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

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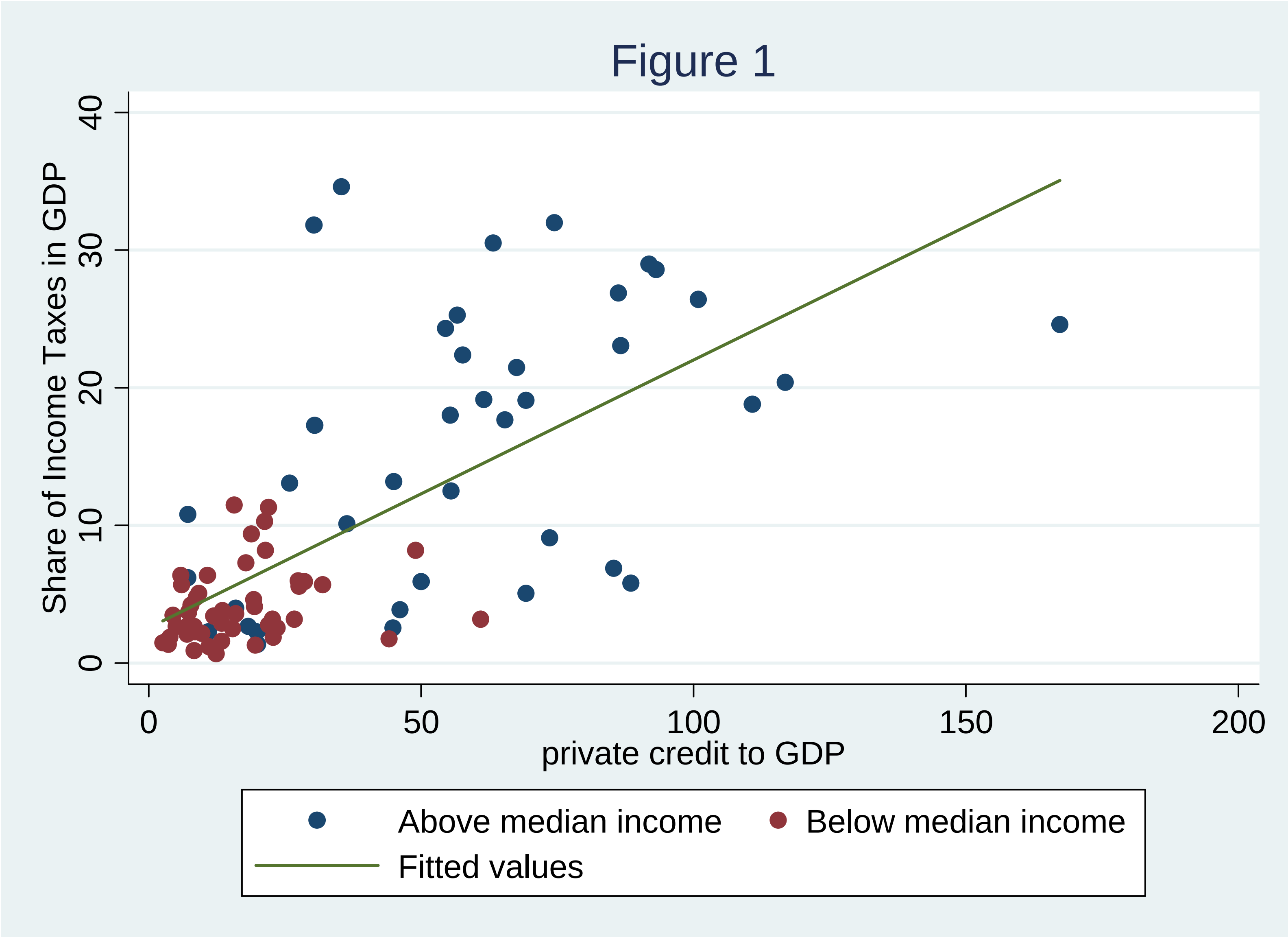
Figure 1
Share of Income Taxes in GDP
0
10
20
30
40
0
50
100
150
200
private credit to GDP
Above median income
Below median income
Fitted values

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***	0.676***	0.436***	0.689***
	(0.138)	(0.191)	(0.147)	(0.143)
Incidence of Democracy up to 1975	0.102	0.034	- 0.182	0.068
	(0.079)	(0.130)	(0.121)	(0.060)
Incidence of Parliamentary Democracy up to 1975	– 0.037	0.219	0.396***	0.138**
	(0.071)	(0.146)	(0.126)	(0.067)
English Legal Origin	– 0.004	0.099	0.064	– 0.003
	(0.038)	(0.073)	(0.070)	(0.051)
Socialist Legal Origin	0.000	– 0.180	– 0.117	0.008
	(0.000)	(0.153)	(0.154)	(0.066)
German Legal Origin	0.396***	0.401***	– 0.011	0.290***
	(0.094)	(0.068)	(0.109)	(0.055)
Scandinavian Legal Origin	0.164***	0.405***	0.221**	0.362***
	(0.033)	(0.061)	(0.097)	(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***	0.683***	0.747***	0.678***
	(0.229)	(0.201)	(0.246)	(0.211)
Incidence of Democracy up to 1975	0.005	– 0.037	0.057	0.097
	(0.085)	(0.096)	(0.062)	(0.064)
Incidence of Parliamentary Democracy up to 1975	0.123	0.208**	0.231***	0.166**
	(0.086)	(0.094)	(0.074)	(0.069)
English Legal Origin	– 0.013	- 0.012	– 0.015	0.013
	(0.069)	(0.061)	(0.056)	(0.051)
Socialist Legal Origin	0.051	– 0.332***	– 0.155**	– 0.110
	(0.095)	(0.084)	(0.065)	(0.082)
German Legal Origin	0.283***	0.290***	0.295***	0.206***
	(0.064)	(0.093)	(0.084)	(0.065)
Scandinavian Legal Origin	0.333***	0.195**	0.364**	0.363***
	(0.068)	(0.078)	(0.141)	(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).