Endogenous Enforcement Institutions

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Abstract

Better legal institutions favor economic development, but only in States with sufficiently constrained executive power. We document this novel pattern across developing countries, and build a simple model that illustrates how power, and the institutions that constrain or complement it, may affect development. We show that there is a tradeoff between the two facets of power—enforcement and expropriation. As a ruler’s power grows, his temptation not to enforce diminishes while the temptation to expropriate grows. As a consequence, private enforcement optimally evolves into State enforcement, and legal institutions, which relax the ruler’s incentive constraint on enforcement, lose economic importance vis-à-vis political institutions, which limit the executive’s ability to expropriate. Our results are consistent with the observed cross-country patterns, as well as with historical evidence on the transition from the “Law Merchant” private enforcement system to the State.

Keywords: Coercive power; Expropriation; Enforcement; State.
JEL codes: H11; K42; P48.

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1. Introduction

In the debate concerning the impact of institutions on economic development, two points of view have recently gained prominence. The first, based on the ideas of North (1981), Engerman and Sokoloff (1997), and Acemoglu et al. (2001), stresses the role of political institutions in constraining the power of ruling elites and enforcing property rights. The second, developed by Glaeser and Shleifer (2002), Djankov et al. (2003b), and La Porta et al. (2008), focuses instead on the importance of legal institutions in guaranteeing the enforcement of contracts.

The relative importance of constraints on expropriation power and legal institutions for development was investigated empirically by Acemoglu and Johnson (2005), using a cross-section of former European colonies. On one hand, they find that former colonies that inherited secure property rights from their colonizers developed faster. On the other hand, they find that holding the security of property rights constant, colonies that inherited more flexible and effective court systems (i.e., “better” legal institutions) did not achieve significantly greater development than those with more formalistic legal systems.

A closer look at their data, however, reveals an interesting, and more nuanced, pattern.

<< Place Table 1 here >>

Panel A of Table 1 above reports the results of ordinary least-squares regressions with GDP per capita and foreign direct investment (FDI) attractiveness as measures of
economic development, and the two institutional quality measures used by Acemoglu and Johnson (2005)—constraints on the executive and procedural complexity of courts—as explanatory variables. While columns 1 and 4, displaying the separate effects of these two types of institutions on development, are consistent with the findings of Acemoglu and Johnson (2005), columns 2 and 5 show that the interaction between institutions is negatively and significantly correlated with development. In other words, worse legal institutions are associated with lower levels of economic development when constraints on the executive are strong, but not when those constraints are weak.

Since these correlations suffer from the potential endogeneity of institutions, we repeat our regressions using the identification strategy developed by Acemoglu and Johnson (2005)—that is, using British legal origin as an instrument for the contemporary quality of legal institutions, and population density in the colonized country in 1500s as an inverse instrument for contemporary constraints on the executive. The results, displayed in Panel B of Table 1, confirm the pattern suggested by the OLS estimations: legal procedural complexity has a negative effect on development, but only in former colonies that have strong constraints on the executive (columns 9 and 10).

Appendix 1 describes the construction of this measure and provides a brief discussion of the sample, of the controls used in our regressions, and the descriptive statistics for the main variables. The measure of constraints on the ruler comes from Gurr (1997) and is the degree of constraints on the executive branch of the government, averaged for the 1990s. As an inverse proxy for judicial quality, we use the 2004 World Bank index of procedural complexity in settling a commercial debt between private parties. Some scholars have questioned the quality of the instruments for constraints on the executive proposed by Acemoglu and coauthors (e.g., Albouy 2012). Our purpose here is to document an empirical puzzle in the data analyzed by Acemoglu and Johnson (2005) that provides a motivation for our model. Hence, we use their instrumental variables as a robustness check, but we do not take a stance on their ultimate validity.
What are the economic forces driving these patterns? Why does the effect of legal institutions on development depend on how the power of ruling elites is constrained? In this paper we develop a simple model of the costs and benefits of State power, which addresses these questions and, more broadly, illustrates how power, and the institutions that constrain it or complement it, may affect long-term economic development and welfare.

In our model, two powerless agents and a powerful ruler interact repeatedly. Agent 2 (a buyer, an employer) acquires a good or a service from agent 1 (a seller, an employee) in exchange for compensation. Given that this is a non-spot exchange, agent 1 performs only if he expects agent 2 to pay him the promised compensation (contract enforcement), and the ruler not to expropriate it (property rights protection). In the absence of well-functioning commitment mechanisms neither expectation is fulfilled, and the resulting equilibrium is characterized by low social surplus.

Since the parties interact repeatedly, better outcomes may be achieved by conditioning future cooperation to the agents’ and the ruler’s present behavior. In particular, agent 2 may prefer to pay agent 1 today and receive higher surplus in the future from agent 1’s performance, and the ruler may prefer not to expropriate agent 1 today and collect part of the surplus through steady tax revenues in the future. We call this solution “private ordering” because the value of future voluntary cooperation between productive agents and the ruler directly guarantees the enforcement of both contracts and property rights.
Alternatively, a “State” may be created where the ruler takes up the role of contract enforcer. In a State, if the buyer fails to pay the seller, and if the ruler is able to verify non-payment, the ruler may confiscate the buyer’s property and, in addition, may inflict on the buyer a costly coercive punishment (for instance, imprisonment). Since the ruler himself cannot be punished coercively, his repeated interaction with the agents is used to prevent expropriation, as in private ordering. In addition, the repeated interaction is also used to provide the ruler with an incentive to inflict costly punishments whenever called upon. If the ruler’s power is strong, so that inflicting a given punishment is not too costly, and if the judicial technology is effective, so that punishments upon discovery of contractual breach need not be too tough, then the threat of State enforcement will be credible.

The key implication of our model is that there is a tradeoff between the two dimensions of coercive power—contractual enforcement and expropriation. When his power is constrained, the ruler is not tempted to expropriate; however, because inflicting coercive punishments with limited power is costly, he is tempted to shirk on enforcement. In that case, it is optimal for the ruler not to enforce—that is, private ordering dominates. As the ruler’s power grows, his temptation not to enforce diminishes while the temptation to expropriate grows, so State enforcement becomes more attractive than private ordering. At high enough levels of power, the ruler’s binding incentive constraint is that on expropriation, whereas the incentive constraint on enforcement becomes slack. As a result, improvements in the judicial technology, which increase the ruler’s ability to verify contract breach and hence relax his incentive constraint on enforcement, no longer raise social surplus.
The above result provides a theoretical explanation for the empirical patterns in Table 1: legal institutions, which reduce the costs of contract enforcement by the State, favor economic development only if State power is sufficiently constrained, and hence the ruler’s temptation to shirk on enforcement is binding. More broadly, our model implies that the effects of political and legal institutions on development interact, and hence should not be analyzed in isolation, and that pro-development reforms should focus on relaxing the binding institutional constraint on State power. Reforms that focus on the non-binding constraint—for instance, by improving courts when State power is too strong, or constraining the ruler’s discretion when State power is already weak—will have no effect on development, even if they go in the “right” direction.

By showing that the State should not enforce contracts when the ruler’s power is too constrained, our model also provides a theory of the choice between private and public enforcement systems. This theory can explain why, in the Middle Age, State enforcement applied to local disputes, where both parties were subject to the same ruler, while the Law Merchant private enforcement system applied to disputes between merchants, who often belonged to different jurisdictions within a feudal State, and hence could not be easily coerced by the king. Our result also explains why, in parallel with reductions in the cost of coercion and the consequent switch from feudal to centralized States (Tilly 1990; Gennaioli and Voth 2015), the Law Merchant was gradually replaced by court-enforcement systems backed by the State’s coercive power (Milgrom et al. 1990; Cutler 2003; Masten and Prüfer 2014).
Related literature

This paper relates to a broad literature in political economy, which studies how the State can credibly commit not to use violence in order to expropriate citizens. In particular, Greif et al. (1994) show how repeated interactions between rulers and traders can generate commitment. Olson (1993) and Acemoglu (2003) emphasize how a ruler’s monopoly on coercion limits his ability to commit. Elaborating on these contributions, more recent works study how institutions such as open access to markets and federalism (Weingast 1995; de Figueiredo and Weingast 2005; North et al. 2009), democratic budgetary control (Besley and Persson 2011a, 2011b), and democratic elections (Fearon 2011), may soften the ruler’s commitment problem. Evidence consistent with this mediating role of political institutions has been provided, among others, by Acemoglu et al. (2001, 2002, 2005), Acemoglu and Johnson (2005), and Dincecco et al. (2011).

Our paper contributes to the above literature by jointly analyzing the ruler’s commitment not to expropriate and his commitment to enforce contracts as consequences of his monopoly on coercion, and by showing that the two commitment problems interact. Our results, which are consistent with the observed facts from former colonies, reconcile the works stressing the pro-development effect of legal and judicial institutions (e.g., Djankov et al. 2002, 2003b; Auer 2013) with those stressing the importance of constraints on the expropriation capacity of rulers and the elites (e.g., Acemoglu et al. 2001, 2002; Acemoglu and Johnson 2005).

Our paper also relates to the literature on “private ordering”, which emphasizes how self-enforcing agreements, which are sustained by the parties’ interest in maintaining
bilaterial or multilateral relationships rather than by the threat of coercion, can generate “order without law”. For instance, Ostrom (1990) and Ellickson (1991) study how communities can, respectively, preserve public good provision from free-riding, and protect property rights, in the absence of State intervention. Milgrom et al. (1990), Dixit (2003a, 2003b), and, more recently, Hadfield and Weingast (2012a, 2012b), Masten and Prüfer (2014), and Levine and Modica (2014) analyze private enforcement systems for commercial transactions. Bernstein (1992) and Williamson (1991) discuss how parties involved in economic exchanges may “opt out” of the State’s legal system, either contractually or by integrating their activities into a unified firm. These literatures are reviewed by Dixit (2004) and Greif (2006).

An implicit assumption in most of the literature on private ordering is that enforcement by the State is preferable whenever breach can be verified by courts, so the choice between private and State enforcement is largely driven by information costs. Our paper innovates on this literature by showing that a tradeoff between State enforcement and private enforcement exists even in the absence of verifiability problems, and that an important driver of the choice between the two enforcement systems, ignored by almost all the existing studies, is the ruler’s cost of credibly committing to enforce, which is affected by the coercion technology.

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4 There is also a broad theoretical literature on relational, or informal, contracts, which studies how self-enforcing agreements, alone or in combination with court-enforced agreements, can be used to contract over actions that are non-verifiable by courts. See MacLeod (2007) and Malcomson (2013) for comprehensive reviews.

5 One exception is Gibbons and Rutten (2007), which, however, does not study the role of the coercion technology. In a paper subsequent to ours, Acemoglu and Wolitzky (2015) develop a model of specialized enforcement and compare it to community enforcement. However, they abstract away from the problems of
The rest of the paper is organized as follows. Section 2 presents the setup of the model. Section 3 analyzes private ordering. Section 4 analyzes the State. Section 5 presents our results on how power and the ruler’s enforcement technology affect welfare and development, and discusses some applications. Section 6 concludes.

2. The model

There are two agents, specialized in production, and a ruler, specialized in coercion. All parties are risk-neutral and discount next-period incomes at the common factor $\delta$. At time zero, the two agents live outside the ruler’s territory, where they earn incomes that we assume to be large enough for all the monetary payments in the model to be feasible.

Contracts. At the beginning of each period, the two agents decide whether to engage in a productive relationship in the ruler’s territory. If they do so, they may write a contract whereby agent 1 takes action $a \in \{0,1\}$ at cost $C(a) = aC$ in exchange for a payment $b$ from agent 2. If the contract is signed and honored, agent 2 obtains gross income $V(a) = aV$, where $V > C$. We may interpret agents 1 and 2 as an employee and an employer, or alternatively, as a seller and a buyer.

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expropriation by the specialized enforcers, and the interaction between enforcement and expropriation, which we focus on.

While under-formalized, the problem of making costly enforcement credible (“guarding the guardians”) has been discussed in the economics literature (see Dixit 2004 and Hurwicz 2008 for a review). More recent models focus on how to design contracts that motivate supervisors to spend monitoring effort (e.g., Rahman 2012, Mookherjee 2013). Our paper brings these ideas into a model where the choice of using costly enforcement is endogenous.
**Coercive power.** Following Bates et al. (2002), we assume that while the ruler is a specialist in coercion, his power may be bounded. We index the ruler’s power by $\psi \in [0,1]$, with $\psi = 0$ and $\psi = 1$ representing the two extreme cases of a powerless ruler and a ruler whose power is unconstrained, respectively. We may interpret $\psi$ as (an inverse measure of) the two agents’ ability to escape the ruler’s territory, or alternatively, as (an inverse measure of) their ability to defend themselves from the ruler.

By using his power, the ruler may inflict disutility $L$ to agent 1 or agent 2 at cost $\lambda(L,\psi)$, where we assume $\lambda(0,\psi) = \lambda(L,1) = 0$ for any $L$ and $\psi$, $\lambda(L,0) = \infty$ for any $L$, $\lambda_1 > 0$, and $\lambda_\psi \leq 0$. The cost $\lambda(L,\psi)$ may be interpreted as the ruler’s expenditure or the cost of effort to imprison the agents.

The ruler may use his power to enforce contracts between agent 1 and agent 2 (a productive use), as well as to expropriate their wealth (a predatory use). We analyze the former in Section 4. Regarding expropriation, we assume the ruler may grab a share $\psi$ of the incomes earned by the agents inside his territory by inflicting disutility $\tilde{L}$, which we normalize to zero for simplicity.\(^7\) Incomes earned outside the ruler’s territory cannot be expropriated.\(^8\)

**Information.** We assume throughout the model that if either of the two productive agents breaches an agreement (respectively, by not taking the promised action or by not

\(^7\) All of the model’s results continue to hold (in fact, they are strengthened) for $\tilde{L} > 0$, provided that the ruler gains from expropriating (that is, provided that $\lambda(\tilde{L},\psi)$ is low enough).

\(^8\) If $\psi$ is interpreted as the agents’ defense capability, it must be assumed that military endowments are too weak for the agents to engage in active coercion by expropriating each other or the ruler. This is consistent with our assumptions that the agents are specialized in production, rather than coercion.
making the promised payment), the ruler observes it with probability \( q \in (0,1] \). We interpret \( q \) as the likelihood that the ruler hears a valid contract breach claim, and we refer to it as the quality of the ruler’s “judicial” technology. All other actions and events in the model (including whether the ruler hears a valid breach claim) are publicly observed. Notice that the model’s results hold a fortiori under a perfect judicial technology \((q = 1)\). However, allowing for \( q < 1 \) generates interesting comparative statics, as discussed in sections 5 and 6.

*Punishments.* Since \( V > C \), it is efficient for the two agents to enter the ruler’s territory and contract action \( a = 1 \) in every period. However, if the agents cannot commit to honor the contract, or if the ruler cannot commit to respect their property, the only equilibrium is one where agent 1 takes no action and no production occurs. To avoid this inefficient outcome, at time zero the ruler communicates to the agents that in any period they can produce in his territory upon paying an entry fee \( t \) (without loss of generality, we assume it is paid by agent 2), and that if after entering they contract action \( a = 1 \) and honor their contract, they will be guaranteed income taxes not higher than \( \gamma V \) and \( \beta b \), respectively, where \( \gamma, \beta \in [0, \psi] \). To ensure compliance, the ruler also announces punishments that will be inflicted on the agents if they breach their contract, and on the ruler himself if he raises income taxes above the promised rates, or if he fails to punish the agents when prescribed.

We partition the set of punishments into two classes: those that involve coercion by the ruler, and those that do not. For given punishments, we focus on equilibria of the repeated game that maximize the ruler’s payoff, and where a player’s strategies at any
point in time depend on another player’s past moves if, and only if those moves are jointly observed by the two players. As we will see in the next sections, unlike perfect public equilibrium (PPE), this equilibrium concept allows the two agents to punish each other’s deviations even when the ruler does not observe them. When \( q = 1 \), our equilibrium concept coincides with PPE.\(^9\) Notice that given the absence of liquidity constraints, there is no loss in restricting attention to stationary equilibria where the agents’ and the ruler’s actions are the same in every period (MacLeod and Malcomson 1989; Levin 2003).

Given the ruler’s time-zero choice of an entry fee, \( t \), income tax rates, \( \gamma \) and \( \beta \), and enforcement institutions, the sequence of moves in each period is as follows: 1) the agents decide whether to enter the ruler’s territory in exchange for entry fee \( t \), and what contract \((a, b)\) to sign; 2) the agents decide whether to honor their contract by choosing an action (agent 1) and a payment (agent 2); 3) the ruler decides whether to stick to the promised tax rates, \( \gamma \) and \( \beta \), or raise them to the highest feasible level \( \psi \).

Discussion of the assumptions

In setting up our model we have made several simplifying assumptions, relaxing any of which does not significantly alter our results. First, we have assumed the ruler monopolizes coercion in his territory and that the agents can freely exit at the end of each period, so that the ruler’s deviations can be punished by withdrawing future entry fees

\(^9\) In a PPE, the players’ strategies constitute a Nash equilibrium following any publicly observed history (Fudenberg et al. 1994).
and taxes. Alternatively, we could allow for the agents to hold some coercive power and use it to rebel in case the ruler deviates. This approach would create an additional role for rebellion-coordinating institutions such as political elections (Fearon 2011), but unless rebellions are certain to succeed, it would not change our analysis of how the coercion and judicial technologies determine equilibrium outcomes and optimal punishments. For our results to hold, all we need is that the ruler can be imperfectly punished, one way or another.

Second, and related, we have assumed a three-people economy where the ruler controls power directly. The model would readily generalize to the case of multiple agents. The model is also robust to the inclusion of soldiers upon whom the ruler must rely to enact coercion, provided that such soldiers are (to some degree) insulated from the powerless players (agent 1 and agent 2) and loyal to the ruler. Under these assumptions, soldiers could not enter an efficient “grand bargain” with the agents, and they would be willing to obey the ruler’s orders up to some limit. Our power parameter $\psi$ could then be reinterpreted as a measure of soldiers’ loyalty to the ruler.

Finally, we have assumed a simple production technology with binary actions and outcomes, in order to minimize the notation. All of the results that follow would be qualitatively identical in a model with continuous productive actions and outcomes.

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10 For a model where the ruler has some ability to coerce agents into working for him, see Acemoglu and Wolitzky (2011). Unlike us, they analyze a static model where exerting coercion ex post is costless (although developing coercion capacity is costly). Hence, their results do not relate to the ruler’s ability to commit on the use of coercion, which is the focus of our paper.
3. Non-coercive enforcement: private ordering

We begin by studying “private ordering” equilibria, in the spirit of Greif et al. (1994) and others. Under private ordering, deviations are not punished coercively but rather, by reverting to the inefficient, non-cooperative equilibrium with zero production. Specifically, we assume that if agent 1 deviates by not taking action \( a_1 = 1 \), agent 2 does not pay him in the current period and stops contracting with him in subsequent periods. If agent 2 deviates by not making the promised payment, agent 1 stops contracting with him in subsequent periods, and the ruler raises his income tax rate from \( \gamma \) to \( \psi \) in the current period if he observes the deviation. Finally, if the ruler deviates by raising taxes above the promised rates \( \gamma \) and \( \beta \) in the absence of deviations by the agents, both agents stop producing in his territory in subsequent periods.

For agent 1 to spend action \( a = 1 \) under private ordering, two sets of conditions must hold. First, the ruler must be willing to invite the agents to produce in his territory by offering the entry fee \( t \) and the income tax rates \( \gamma \) and \( \beta \), and the agents must be willing to accept the ruler’s offer (i.e. the participation constraints must be satisfied):

\[
\begin{align*}
& t + \gamma V + \beta b \geq 0 \quad \text{for the ruler}, \\
& (1 - \beta)b - C \geq 0 \quad \text{for agent 1}, \\
& (1 - \gamma)V - t - b \geq 0 \quad \text{for agent 2}.
\end{align*}
\]

Second, and in chronological order, agent 1 must be willing to spend the agreed upon action, agent 2 must be willing to make the agreed upon payment, and the ruler must be
willing not to expropriate the agents’ incomes—that is, not to tax them more than promised (i.e. the incentive constraints must be satisfied):

\[-C + (1 - \beta) b + \frac{\delta}{1 - \delta} [(1 - \beta) b - C] \geq 0 \text{ for agent 1;} \quad (4)
\]

\[-b + \frac{\delta}{1 - \delta} [(1 - \gamma) V - t - b] \geq -q (\psi - \gamma) V \text{ for agent 2 and} \quad (5)
\]

\[
\gamma V + \beta b + \frac{\delta}{1 - \delta} (\gamma V + \beta b + t) \geq \psi V + \psi b \text{ for the ruler.} \quad (6)
\]

Notice that we are assuming agent 2 pays agent 1’s bonus b out of his offshore income, which cannot be expropriated until it enters the ruler’s territory as a bonus, and that agent 2 cannot pay agent 1 offshore. These assumptions imply that both the output V and the bonus b are potentially subject to expropriation.

Let agent 2 make the minimum payment consistent with (2), \( b = \frac{C}{1 - \beta} \). This payment also satisfies agent 1’s incentive constraint (4). Then, the ruler chooses t, \( \gamma \) and \( \beta \) to maximize his payoff, \( t + \gamma V + \beta b \), subject to (1), (3), (5) and (6). It is optimal for the ruler to choose the highest possible entry fee \( t = (1 - \gamma) V - \frac{C}{\delta (1 - \beta)} + \frac{1 - \delta}{\delta} q (\psi - \gamma) V \), such that (4) binds and (2) is slack. After substituting this into (6), it becomes clear that it is also optimal for the ruler to choose \( \beta = 0 \), as that increases his net income while relaxing the non-expropriation constraint (6). Since (6) is tighter than (1), the ruler’s problem further simplifies to choosing \( \gamma \) to maximize his payoff, subject to (6). If (6) holds for
some \( \gamma \), it must hold for \( \gamma = \psi \). This gives us a necessary condition for agent 1 to take action \( a = 1 \) under private ordering:

\[
R^p (\psi, C) \equiv (1 + \psi)C \leq \frac{\delta}{1 - \delta} (V - C).
\]

Condition (EC\(^p\)) is also sufficient because provided that it holds, the ruler maximizes his payoff by choosing the minimum \( \gamma \) consistent with (6), that is,

\[
\gamma = \psi - \frac{\delta(V - C) - (1 - \delta)(1 + \psi)C}{(1 - \delta)(1 - q)V}.
\]

**Proposition 1**: Under private ordering, agent 1 takes action \( a = 1 \) in every period if, and only if (EC\(^p\)) holds.

In words, private ordering requires that the present discounted value of producing in the ruler’s territory exceed the sum of agent 2’s temptation not to pay agent 1 and the ruler’s temptation to expropriate the payment. If that condition holds, private ordering promotes efficient exchange by guaranteeing both contracts and property rights. Proposition 1 implies that private ordering is more likely to work when the parties are patient enough (high \( \delta \)), and when the ruler’s coercive power is sufficiently constrained (low \( \psi \)).

### 4. Coercive enforcement: the State

We now study the case where the ruler punishes contract violations by the agents coercively. Since third-party enforcement is usually seen as a key attribute of modern
states, we refer to this arrangement as the “State”.\textsuperscript{11} An important point in our analysis is that, because coercive punishments are costly and they can only be imposed by the ruler, the ruler must be provided with incentives to punish when prescribed—that is, State enforcement must be itself self-enforcing.\textsuperscript{12}

Formally, deviations in the State are punished as follows. If agent 1 deviates by not spending action $a = 1$, in the current period agent 2 does not pay him and the ruler imposes on him disutility $L_A$ via coercive punishments if he observes the deviation, whereas in subsequent periods all parties revert to equilibrium behavior. If agent 2 deviates by not paying agent 1, in the current period the ruler raises his income tax rate from $\gamma$ to $\psi$ and imposes on him disutility $L_B$ via coercive punishments if he observes the deviation, whereas in subsequent periods all parties revert to equilibrium behavior. Finally, if the ruler deviates by raising taxes above the promised rates $\gamma$ and $\beta$, or by failing to impose coercive punishments when prescribed, the agents stop producing in his territory in subsequent periods (recall that the ruler cannot be punished coercively). In the State, enforcement institutions optimally imply reversion to the equilibrium behavior following coercive punishments because the ruler must receive rents from continuation of his relationship with the agents in order to be willing to incur the cost of punishments. Reversion to equilibrium behavior insures that such continuation rents are maximized.

\textsuperscript{11} In modern States, contract breach is typically not followed by a coercive punishment but, rather, by a court’s order imposing monetary damages. However, the court’s order is itself backed by a threat of coercion: if the losing defendant has funds but does not pay damages as ordered, he can be held in contempt of court—a criminal offense—and imprisoned.

\textsuperscript{12} Assuming costly punishments does not rule out that the ruler may receive some private benefit from punishing devious behavior (Ostrom \textit{et al.} 1992, Kosfeld and Rustagi 2015), so long as such benefit is outweighed by the cost. This assumption seems appropriate in our context where the ruler is an institutional third party, and it is consistent with recent experimental evidence showing that third-party punishers who are not accountable tend to shirk on punishments (Ottone \textit{et al.} 2015).
For agent 1 to take the promised action under the State, participation constraints (1) through (3), and the ruler’s non-expropriation constraint (6), must still hold. The agents’ incentive constraints from private ordering are replaced by the condition that the expected coercive punishments be strong enough to deter deviations:

\[
L_A \geq \frac{C - (1 - \beta)b}{q} \text{ for agent 1, and}
\]

\[
L_B \geq \frac{b - (\psi - \gamma)V}{q} \text{ for agent 2.}^{13}
\]

In addition, coercive punishments must be feasible, the ruler must be willing to impose coercive punishments when prescribed:

\[
-\lambda \left( \max (L_B, L_A), \psi \right) + \frac{\delta}{1 - \delta} (\gamma V + \beta b + t) \geq 0.
\]

Hence, the ruler chooses \( t, \gamma, \beta, L_B \) and \( L_A \) to maximize his payoff, \( t + \gamma V + \beta b \), subject to conditions (1) through (3), (6), and (7) through (9). If the ruler’s non-expropriation and punishment constraints (6) and (9) hold for some transfer \( t \), they must hold for the maximum transfer that satisfies agent 2’s participation constraint (3), so the ruler chooses \( t = (1 - \gamma)V - b \). Similarly, if the ruler’s incentive constraints hold for some payment \( b \) and punishment \( L_B \), they must hold for the minimum values of \( b \) and \( L_B \) that satisfy agent 1’s participation constraint (2) and agent 2’s incentive constraint (8), so

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\(^{13}\) Notice that the judicial quality \( q \) appears in conditions (7) and (8) due to our assumption that the ruler only hears a contract breach claim with probability \( q \). If the ruler heard breach claims with certainty, and given that the ruler’s punishments do not benefit the victim of breach, (7) and (8) could be relaxed by having the ruler punish whenever a claim is made, even if its truthfulness cannot be verified.
agent 2 chooses \( b = \frac{C}{1-\beta} \) and the ruler chooses \( L_b = \frac{C}{q(1-\beta)} - (\psi - \gamma) V \). Agent 1’s incentive constraint, (7), is looser than his participation constraint, (2), so the ruler chooses \( L_A = 0 \). Substituting into the ruler’s problem, this simplifies to choosing \( \gamma \) and \( \beta \) to maximize the social surplus, \( V - C \), subject to the following two necessary and sufficient conditions for self-enforcement:

\[
R^H (\psi, q, \gamma, \beta, C, V) \equiv \lambda \left( \frac{C}{q(1-\beta)} - (\psi - \gamma) V, \psi \right) \leq \frac{\delta}{1-\delta} (V - C), \quad (EC^H)
\]

\[
R^V (\psi, \gamma, \beta, C, V) \equiv (\psi - \beta) \frac{C}{1-\beta} + (\psi - \gamma) V \leq \frac{\delta}{1-\delta} (V - C). \quad (EC^V)
\]

Condition \((EC^H)\) is the enforcement, or “horizontal”, constraint, and it determines the ruler’s incentive to punish breach of the contract between the two agents. We call it “horizontal” because both agents lack coercive power and, therefore, are hierarchically similar. Condition \((EC^V)\) is the non-expropriation, or “vertical” constraint, and it determines the ruler’s incentive not to expropriate the agents. We call it “vertical” because the ruler has power and, therefore, he is hierarchically superior to both agents.

Since both \((EC^H)\) and \((EC^V)\) must hold, we can combine them into a unique condition for the social contract to be self-enforcing under the State:

\[
R^S (\psi, q, \gamma, \beta, C) \equiv \max \left\{ R^V (\cdot), R^H (\cdot) \right\} \leq \frac{\delta}{1-\delta} (V - C). \quad (EC^S)
\]

From the above analysis, it immediately follows that
Proposition 3: In the State, agent 1 spends action \( a = 1 \) in every period if, and only if conditions (EC\(^S\)) holds.

5. Welfare analysis

We now use our model to study how the ruler’s power (parameter \( \psi \)) and his judicial technology (parameter \( q \)) determine the equilibrium social surplus. Our analysis proceeds in three steps. First, we characterize the equilibrium social surplus as a function of the enforcement regime (Proposition 4). Then, we show how coercive power affects the surplus-maximizing enforcement regime (Proposition 5). Finally, we study how judicial quality and power jointly determine the equilibrium surplus (Proposition 6).

A key preliminary point here is that the long-term surplus from cooperation (the right-hand side of conditions (EC\(^b\)), (EC\(^h\)) and (EC\(^v\))) is the same under both private ordering and the State, whereas the present reneging temptation (the left-hand side) differs across enforcement regimes. Therefore, at intermediate levels of the parties’ discount rate, social surplus is maximized by choosing the enforcement regime that generates the lowest reneging temptation.

Proposition 4: Assume the reneging temptation under private ordering differs from the reneging temptation under the State. Then, there are critical discount rates \( \delta^L \) and \( \delta^H \), with \( \delta^H > \delta^L \), such that: (i) for \( \delta < \delta^L \), social surplus is zero under both enforcement regimes; (ii) for \( \delta^L < \delta < \delta^H \), social surplus is \( V - C \) under the
enforcement regime with the lowest reneging temptation, and zero under the other regime; and (iii) for \( \delta > \delta^H \), social surplus is \( V - C \) under both enforcement regimes.

**Proof:** In appendix.

While analytically simple, the above result is conceptually subtle. Most formal analyses of contractual exchange assume that private enforcement mechanisms must rely on the parties’ patience and on the prospect of future transactions (the discount factor \( \delta \)) to deter non-compliance, whereas public enforcement benefits from the State’s commitment to punish violators. That is why economists usually see self-enforcement as the price to pay for using informal and relational contracts and thus escape cumbersome court verification (e.g., Baker et al. 1994; Kvaloy and Olsen 2009; Gil and Zanarone 2015). By endogenizing the State’s use of power as part of a social contract, we show that the “shadow of the future” (\( \delta \)) affects surplus under both private and public enforcement, and that which enforcement regime maximizes surplus depends on the reneging temptation, which in turn depends on the technology.

Building on the above analysis, we can pin down more precisely what enforcement regime maximizes social surplus at different levels of the ruler’s power. Since the ruler extracts all the surplus through the upfront payment \( t \), Proposition 4 implies that he will choose the enforcement mode that minimizes the reneging temptation whenever the self-enforcement conditions are binding—that is, when \( \delta \) is lower than, but close to, \( \delta^L \).

**Proposition 5:** Suppose \( \delta \) is slightly smaller than \( \delta^L \). Then, there is a critical power level, \( \psi \in (0,1) \), such that social surplus under the State is higher than under private
ordering when the ruler is constrained \( (\psi < \underline{\psi}) \), and lower when the ruler is unconstrained \( (\psi > \underline{\psi}) \).

**Proof:** In appendix.

We now use Proposition 5 above to study how power and the enforcement technology affect social surplus.

**Proposition 6:** Suppose \( \delta \) is slightly smaller than \( \delta^* \). Then, there is \( \overline{\psi} \in (0,1) \), with \( \overline{\psi} > \overline{\psi} \), such that social surplus increases in the ruler’s judicial quality, \( q \), for \( \psi \in (\overline{\psi}, \overline{\psi}) \), whereas the social surplus does not depend on \( q \) for \( \psi \notin (\overline{\psi}, \overline{\psi}) \).

**Proof:** In appendix.

Intuitively, improvements in the judicial technology fail to increase surplus when the ruler’s power is so weak that enforcement of contracts by the State is not credible \( (\psi < \underline{\psi}) \), or so strong that the State’s binding credibility problem is expropriation, rather than enforcement \( (\psi > \overline{\psi}) \). When the ruler’s power is high enough for the State to exist, but low enough for the ruler’s enforcement constraint to be binding \( (\psi \in (\overline{\psi}, \overline{\psi})) \), improvements in the judicial technology relax such constraint, thereby increasing surplus.

These results are graphically summarized in Figure 1 below.

<<Place Figure 1 here>>
Applications

Institutional interaction

Propositions 5 and 6 above provide a theoretical explanation for the cross-country empirical patterns noted in the introduction, and summarized in Table 1. Legal institutions, which reduce the costs of contractual enforcement by the State, have favored economic development only in those former colonies where a State exists, but its power is sufficiently constrained for the ruler’s temptation to shirk on enforcement to be binding.

Our results have also a normative implication, as they imply that institutional reforms that aim to increase social welfare and promote development, should concentrate on relaxing the ruler’s binding incentive constraint. Reforms that focus on the non-binding constraint—for instance, by improving courts when State power is too strong, or constraining the ruler’s discretion when State power is already weak—will have no effect on development, even if they go in the “right” direction. This normative implications seems consistent with the fact that, facing predatory institutions inherited from Mao’s Cultural Revolution, Chinese reformers have enacted institutional reforms increasing the protection of property rights, while leaving enforcement institutions, and particularly the judiciary, relatively underdeveloped until recent times (Montinola et al. 1995; Weingast 1995; Xu 2011). However, numerous scholars (Peerenboom 2002; Clarke et al. 2008; Xu 2011) argue that to maintain the growth performance of China in the future, it is now urgent to shift the focus of reforms on modernizing its legal institutions.
Optimal enforcement mechanisms

In addition to elucidating the costs and benefits of the ruler’s coercive power and the interaction between political and judicial institutions, Proposition 5 also provides intuitive conditions for when State power should be used to enforce contracts. The key implication of our analysis is that the State should act as an enforcer when it is powerful enough to be able to enforce at low cost. Otherwise, the threat of State punishment against violations is not credible, and contracts should be enforced privately.

This result helps explaining one of the major puzzles in the historical evolution of enforcement institutions in Europe: the emergence and disappearance of the private-enforcement system known as the Law Merchant. According to Milgrom et al. 1990, Greif 2006, and others, under the Law Merchant system, breaches of commercial contracts were punished by coordinated traders’ boycotts, rather than by the State. While the Law Merchant seemed a successful institutional arrangement in the Middle Ages, it was subsequent replaced by public enforcement institutions, where judicial rulings on contractual disputes between merchants are backed by the State’s coercive power (Masten and Prüfer 2014).

According to Proposition 5 in our model, increases in the ruler’s coercive power should favor enforcement by the State over private enforcement. In the Middle Ages, States were characterized by a feudal structure where each one of multiple rulers controlled a portion of the State’s territory. As a result, the ability of each ruler (including the king, who was a “primus inter pares”) to exert coercion within the State was limited to its primary sphere of influence. Our model then predicts that in Medieval times, the Law
Merchant system should have been used for long-distance transactions, whereas State enforcement should have been used for more local ones.

Around the XVI century, two large-scale, interconnected historical changes generated an increase in the scope of rulers’ coercive power. First, the rise of the centralized states in Europe implied consolidation of coercive power and the elimination of overlapping, fragmented jurisdictions (Tilly 1990). Second, warfare between European rulers implied substantial improvements in the coercion technology (Blaydes and Chaney 2012; Onorato et al. 2014), which further reinforced consolidation (Tilly 1990; Gennaioli and Voth 2015). These changes contributed to an increase both in the geographic scope of State rulers’ coercive power, and in their ability to exert coercion within the State’s territory. According to our model, this should have unambiguously lead to the replacement of the Law Merchant system by State enforcement.

Research by legal historians supports both our predictions on the choice between Law Merchant and State enforcement across different types of transactions, and on the timing of the disappearance of the Law Merchant and its replacement by the State enforcement system.14 In her detailed study of the evolution of the Law Merchant, Cutler (2003) writes: “While local transactions were heavily regulated by political authorities, long-distance trade was largely immune to the application of local laws and was governed by the law merchant. […] In addition to simply being unable to regulate international transactions in any significant way, the local authorities were unwilling to do so […]

14 Another explanation, complementary to ours, for the rise and fall of the law merchant has been suggested by Masten and Prüfer (2014). They argue that the evolution from local to long-distance trade may have increased the merchants’ cost of verifying other merchant’s violations, thus favoring State enforcement systems that do not rely on coordinated boycotts as a punishment.
[because] the distinguishing feature of medieval Europe was the decentralization of political authority, overlapping feudal jurisdictions, plural allegiances, and asymmetrical suzerainties” (pp. 109, 118, 139).

Moreover, Cutler (2003) argues that with the increasing centralization of States’ power, the enforcement system optimally changed, away from the Law Merchant and towards State-based enforcement: “The emergence of states and their attempts to nationalize and to control foreign commercial activities signaled a change in both the ability and the willingness of political authorities to regulate international transactions. […] This is evident in the priority given to positive law as the most appropriate mechanism for regulating international commerce and the displacement of custom as a primary source of law. […] Effective enforcement came to be associated with the state” (pp. 140-142).

6. Conclusion

Coercive power has an ambiguous social role. On one hand, it encourages investment by enabling the punishment of opportunistic behavior. On the other hand, it discourages investment by permitting expropriation. This ambiguity between the enforcement and the predatory roles of the State has been noted by political economists. For instance, Weingast (1995) describes it as “the fundamental political dilemma”, while Djankov et al. (2003a) label it as the “tradeoff between the costs of disorder and those of dictatorship”. Yet, this dilemma remains understudied in economic models of the State, most of which focus on the predation costs of coercive power (e.g., Greif et al. 1994; Acemoglu 2003;
Besley and Persson 2011a), while abstracting from its potential upside in terms of enhanced social order.

This paper has built a framework for studying economic exchanges in the shadow of a ruler’s coercion. We have shown that, in the presence of repeated interactions, a State where the ruler uses power to enforce contracts, and does not use it to expropriate the gains from trade, can arise as a self-enforcing equilibrium. We have also show that, consistent with the existing historical and cross-country evidence, there is a tradeoff between the two dimensions of the ruler’s coercive power—contractual enforcement and expropriation. When his power is constrained, the ruler is not tempted to expropriate but he is tempted to shirk on enforcement, so it is optimal to replace ruler’s enforcement with private ordering. As the ruler’s power grows, his temptation not to enforce diminishes while the temptation to expropriate grows, so State enforcement becomes more attractive. At high enough levels of power, the ruler’s only binding incentive constraint is that on expropriation, so improvements in the judicial technology, which relax the ruler’s incentive constraint on enforcement, do not increase social surplus.

Our model can be extended in several directions. First, one may allow the ruler to also enter productive contracts with the powerless agents. Along this lines, in a companion paper (Aldashev and Zanarone 2015) we compare the productivity of private firms, where powerless managers and employees contract with each other, and public firms, where managers and employees directly contract with the ruler. We show that in private firms, the powerless agents can rely on the ruler to enforce their contracts, but they are also subject to a risk of expropriation. Conversely, in public firms, contracts must be enforced
via private ordering because the ruler cannot be coercively punished, but the threat of expropriation disappears.

A second extension of the model would be to endogenize the choice of judicial quality (parameter $q$ in the current analysis). That would allow us to disentangle adjudication institutions (“Who verifies contractual breach?”) from enforcement institutions (“Who punishes violations?”) and study how these two types of institutions are jointly determined. From an empirical standpoint, this extension may provide valuable insight into how different legal systems have simultaneously chosen between arbitrators and courts as adjudicators of disputes, and between private ordering and State coercion as enforcement mechanisms, in the course of history (Cutler 2003).

Finally, the model may be extended to study the provision of incentives in firms. Given its ownership of assets and its power to terminate employment relationships and to allocate tasks and rewards (Holmstrom and Milgrom 1994), the firm may be seen as a powerful “ruler”. The firm’s CEO may use his power to expropriate managers and employees (for instance, by changing piece rates or withdrawing discretionary bonuses and promotions), but also to enforce internal contracts between divisional managers and their subordinates (for instance, by immediately firing a manager who fails to promote or pay the subordinate as promised, even when a replacement for the manager cannot be readily found, so that termination is costly for the firm). This may create a tradeoff between “private ordering” governance, where the promise of future rents is used to both enforce internal contracts and deter expropriation, and “State-like” firms, where future
 rents are used to deter expropriation while costly punishments are used to enforce internal contracts.

References


Appendix 1. Construction of the FDI attractiveness measure and summary statistics

We construct the measure of FDI attractiveness as follows. We obtained the value of bilateral inward FDI stocks (in constant USD) of all countries worldwide, for the 1991-2005 period, from the World Investment Directory of the United Nations Conference on Trade and Development (UNCTAD). Given that for many countries and years these values are equal to zero, we add 1 to all the values (a common procedure in empirical trade literature). Next, we estimate the following standard gravity equation (Head and Mayer 2014):

\[
\log (1 + \text{InwardFDI stock}_{ijt}) = \alpha_i \text{Sending country}_{it} + \delta_j \text{Receiving country}_{jt} + X_{ij} \beta + \epsilon_{ijt}
\]

Here, \textit{Sending country}_{it} is a country-year fixed effect for investing country \(i\) in year \(t\), \textit{Receiving country}_{jt} is a country-year fixed effect for recipient country \(j\) in year \(t\), \(X_{ij}\) is the vector of usual pair-specific, time-invariant gravity controls (contiguity, geographic distance, common language—official and spoken by at least 9 per cent of the population in both countries in the pair— and dummies for being in a colonial relationship, having had a common colonizer, and having been part of the same country, in the past), \(\epsilon_{ijt}\) is the error term, and \(\alpha_i\), \(\delta_j\) and \(\beta\) are parameters to be estimated. Finally, we recover the estimated recipient country-year fixed effects, and calculate their means for each country in the Acemoglu and Johnson (2005) sample. This is done for two reasons: the institutional quality measures (and their instruments) are time-invariant; moreover, it is well known that annual FDI statistics can be strongly influenced by large individual deals. We denote the obtained measure as “Mean FDI attractiveness for the 1991-2005 period”. 
Two remarks about this measure are of order here. First, we believe that the FDI is a more direct (and thus a better) proxy for the strength of incentives for productive agents than output per capita. As noted by Dixit (2011), the quality of institutions is likely to play an important role for the FDI decisions of foreign firms, given that “when a multinational establishes a subsidiary and opens a plant in a foreign country, the whole capital stock is at risk from violations of property rights and contracts”. For comparison, however, we also report the results of regressions with output per capita as the dependent variable. Second, the country fixed-effects recovered from the above gravity equation are a more accurate measure of FDI attractiveness than, for instance, the simple 1991-2005 average of FDI flows, because they avoid biases arising from larger FDI flows into countries that happen to be geographically and historically closer to large economies (see Benassy-Quere et al. (2007) and Head and Mayer (2014) for a detailed discussion of this and other related problems).

We use the original sample of former European colonies as used by Acemoglu and Johnson (2005). In the instrumental-variables regression analysis, we use log population density in 1500s (the second instrument employed by Acemoglu and Johnson 2005) instead of log settler mortality (their first instrument), in order to maximize the sample size. Similarly, due to sample-size concerns, among the proxies for the quality of legal institutions used by Acemoglu and Johnson (2005) we opt for the World Bank index of procedural complexity, rather than the index of legal formalism from Djankov et al. (2003). Overall, this gives us a sample of 69 countries instead of 51.
In columns 3, 6, 11, and 12 of Table 1, we add into the specification the dominant religion measures and whether a country is landlocked, as controls. These are among the standard controls used in the empirical literature looking at the long-run comparative development.

Figure A1 shows the histogram of one of our main dependent variables (mean FDI attractiveness), whereas Table A1 presents the summary statistics for the main variables of analysis. We can see that both FDI attractiveness and log GDP per capita in 2003 (our second dependent variable) exhibit substantial variation across countries in the sample.
Appendix 2. Mathematical proofs

**Proposition 4:** Assume the reneging temptation under private ordering differs from the reneging temptation under the State. Then, there are critical discount rates $\delta^L$ and $\delta^H$, with $\delta^H > \delta^L$, such that: (i) for $\delta < \delta^L$, social surplus is zero under both punishment modes; (ii) for $\delta^L < \delta < \delta^H$, social surplus is $V - C$ under the punishment mode with the lowest reneging temptation, and zero under the other mode; and (iii) for $\delta > \delta^H$, social surplus is $V - C$ under both punishment modes.

**Proof:** Let $\delta^S$ be the smallest discount factor such that both $(EC^S)$ holds, and let $\delta^P$ be the smallest discount factor such that $(EC^P)$ holds. Also, define $\delta^L \equiv \min \{\delta^P, \delta^S\}$ and $\delta^H \equiv \max \{\delta^P, \delta^S\}$. For $\delta \in [0, \delta^L)$, neither $(EC^P)$ nor $(EC^S)$ hold, so propositions 2 and 3 imply that social surplus is zero under both private ordering and the State. For $\delta \in [\delta^L, \delta^S)$ and $\delta^L = \delta^P$, surplus is $V - C$ under private ordering and zero under the State. For $\delta \in [\delta^S, \delta^H)$ and $\delta^L = \delta^S$, surplus is $V - C$ under the State and zero under private ordering. Finally, for $\delta \in [\delta^H, 1]$, surplus is $V - C$ under both private ordering and the State. QED.

**Proposition 5:** Suppose $\delta$ is slightly smaller than $\delta^L$. Then, there is a critical power level, $\psi \in (0, 1)$, such that the reneging temptation under the State is higher than under private ordering when the ruler is constrained ($\psi < \underline{\psi}$), and lower when the ruler is unconstrained ($\psi > \underline{\psi}$).
\textbf{Proof:} We prove proposition 5 by showing that, for any given \( q, V, \) and \( C \): (i) 
\[ R^5(0,q,\gamma^*,\beta^*,V,C) > R^p(0,C) \] and (ii) \( R^5(\psi,q,\gamma^*,\beta^*,V,C) \) and \( R^p(\psi,C) \) cross once.

At \( \psi = 0 \), we have \( R^V(0,0,0,V,C) = 0 < R^H(0,q,0,0,V,C) = \infty \), so under the State, the ruler optimally sets \( \gamma^* = \beta^* = 0 \). This implies:

\[ R^p(0,C) = C < R^5(0,q,\gamma^*,\beta^*,V,C) = R^H(0,q,0,0,V,C) = \infty. \tag{A1} \]

This proves claim (i). At \( \psi = 1 \), we have \( R^V(1,1,\beta^*,V,C) = C > R^H(1,q,1,\beta^*,V,C) \) for any \( \beta^* \), so under the State, the ruler optimally sets \( \gamma^* = 1 \). This implies:

\[ R^5(1,q,\gamma^*,\beta^*,V,C) = R^V(1,1,\beta^*,V,C) = C < R^p(1,C) = 2C. \tag{A2} \]

As \( \psi \) grows from zero towards one, \( R^p(\psi,C) \) increases monotonically from \( C \) to \( 2C \). At the same time, \( R^H(\psi,q,0,0,V,C) \) decreases, while \( R^V(\psi,0,0,V,C) \) increases.

Hence, \( R^5(\psi,q,\gamma^*,\beta^*,V,C) \) decreases monotonically in \( \psi \) till:

\[ \psi = k \equiv \{ \inf k : R^H(k,q,0,0,V,C) \geq R^V(k,0,0,V,C) \}). \tag{A3} \]

As \( \psi \) grows beyond \( k \), the ruler optimally raises \( \gamma^* \) and \( \beta^* \) to equalize \( R^V(\psi,\gamma^*,\beta^*,V,C) \) and \( R^H(\psi,q,\gamma^*,\beta^*,V,C) \) until possible, and \( R^5(\psi,q,\gamma^*,\beta^*,V,C) \) increases monotonically in \( \psi \) up to its maximum \( C \). This analysis of the

\[ \text{when } R^H(\psi,q,0,0,V,C) \geq R^V(\psi,0,0,V,C) \text{ for all } \psi, \text{ we say that } k = 1. \]
R^S(\psi, q, \gamma^*, \beta^*, V, C) function, combined with conditions (A1) and (A2), above proves our claim (ii): R^S(\psi, q, \gamma^*, \beta^*, V, C) and R^R(\psi, C) must cross once, and only once. QED.

Proposition 6: Suppose \( \delta \) is slightly smaller than \( \delta^* \). Then, there is \( \bar{\psi} \in (0,1) \), with \( \bar{\psi} > \psi \), such that social surplus increases in the ruler’s judicial quality, \( q \), for \( \psi \in (\psi, \bar{\psi}) \), whereas the social surplus does not depend on \( q \) for \( \psi \notin (\psi, \bar{\psi}) \).

Proof: The proof basically follows from that of proposition 5. For \( \psi < \bar{\psi} \), the ruler chooses private ordering, so the social surplus does not depend on \( q \). For \( \psi \in [\bar{\psi}, k] \), the ruler chooses the State, and the temptation is \( R^S(\psi, q, \gamma^*, \beta^*, V, C) = R^H(\psi, q, 0, 0, V, C) \), decreasing in \( q \). For \( \psi \in [k, 1] \) and \( \psi \) close to \( k \), the ruler chooses, again, the State, and the temptation is \( R^S(\psi, q, \gamma^*, \beta^*, V, C) = R^H(\psi, q, \gamma^*, \beta^*, V, C) = R^V(\psi, \gamma^*, \beta^*, V, C) \), decreasing in \( q \), where \( \gamma^* \) and \( \beta^* \) increase in \( \psi \). For \( \psi \in [k, 1] \) and \( \psi \) close to one, that is, \( \psi > \bar{\psi} \in (k, 1) \), the ruler sets \( \gamma^* = 1 \), and the temptation becomes \( R^S(\psi, q, \gamma^*, \beta^*, V, C) = R^V(\psi, 1, \beta^*, V, C) \), which does not depend on \( q \). QED.
Figure 1a depicts the State equilibrium in settings where only the non-expropriation constraint of the Ruler binds, whereas the contract enforcement constraint is slack. The condition for this is that the ruler’s temptation not to enforce, $R^V_0$, is below his temptation to expropriate, $R^V$, even for $\gamma=\psi_0$ (i.e. under maximum expropriation allowed), so that setting $\gamma=\psi_0$ is optimal. For any discount rate, an exogenous improvement in judicial quality (i.e., a switch from q to q’) does not change the equilibrium point A, because it does not relax the ruler’s binding constraint.
Figure 1b. Improvements in the judicial technology under a moderately constrained State ruler

Figure 1b depicts the State equilibrium in settings where both the non-expropriation and the contract enforcement constraints of the Ruler bind. The conditions for this are that (1) $\texttt{R}^H$ is above $\texttt{R}^V$ for $\gamma=\psi_1$, so that setting $\gamma < \psi_1$ is optimal, and (2) $\texttt{R}^H$ is below $\texttt{R}^V$ for $\gamma=0$, so that there is a $\gamma$ such that $\texttt{R}^H=\texttt{R}^V$. At intermediate levels of the discount rate, an exogenous improvement in the judicial technology (i.e., a shift from $q$ to $q'$) moves the equilibrium from point A to the more efficient point B because it relaxes one of the ruler’s two binding constraints.
Figure 1c. Improvements in the judicial technology under a highly constrained State ruler

Figure 1c depicts the State equilibrium in settings where only the contract enforcement constraints of the Ruler binds. The condition for this is that $R^H$ is above $R^V$ even for $\gamma=0$, so that setting $\gamma=0$ is optimal. At intermediate levels of the discount rate, an exogenous improvement in the judicial technology (i.e., a shift from $q$ to $q'$) moves the equilibrium from point A to the more efficient point B because it relaxes the ruler’s only binding constraint.
Figure A1. Histogram of the mean FDI attractiveness, 1991-2005
Table 1. Effect of non-expropriation and enforcement institutions on FDI attractiveness and income per capita

*Panel A: OLS results*

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<td>67</td>
<td>67</td>
<td>66</td>
<td>69</td>
<td>69</td>
<td>68</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.06</td>
<td>0.11</td>
<td>0.13</td>
<td>0.34</td>
<td>0.38</td>
<td>0.52</td>
</tr>
</tbody>
</table>

Notes: Robust standard errors in parentheses; * significant at 10% level, ** significant at 5% level, *** significant at 1% level.
Table 1. Effect of non-expropriation and enforcement institutions on FDI attractiveness and income per capita

*Panel B: 2SLS results*

<table>
<thead>
<tr>
<th></th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constraints on executive (avg. for 1990s)</td>
<td>1.043</td>
<td>1.064</td>
<td>4.984</td>
<td>4.888</td>
<td>5.645</td>
<td>4.542</td>
</tr>
<tr>
<td></td>
<td>(0.377)***</td>
<td>(0.288)***</td>
<td>(2.270)**</td>
<td>(2.066)***</td>
<td>(2.422)**</td>
<td>(2.363)*</td>
</tr>
<tr>
<td>Legal institutions: Procedural complexity</td>
<td>0.359</td>
<td>0.183</td>
<td>4.204</td>
<td>3.896</td>
<td>4.102</td>
<td>2.365</td>
</tr>
<tr>
<td></td>
<td>(0.289)</td>
<td>(0.216)</td>
<td>(2.239)*</td>
<td>(1.944)**</td>
<td>(1.637)**</td>
<td>(1.405)*</td>
</tr>
<tr>
<td>Interaction term</td>
<td>-0.809</td>
<td>-0.787</td>
<td>-0.929</td>
<td>-0.756</td>
<td>(0.418)**</td>
<td>(0.419)*</td>
</tr>
<tr>
<td></td>
<td>(0.433)*</td>
<td>(0.380)**</td>
<td>(0.418)**</td>
<td>(0.419)*</td>
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</tr>
<tr>
<td>Catholics as % of population in 1980</td>
<td>0.006</td>
<td>0.043</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.032)</td>
<td>(0.026)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muslims as % of population in 1980</td>
<td>-0.017</td>
<td>0.003</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>(0.013)</td>
<td>(0.010)</td>
<td></td>
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<tr>
<td>Protestants as % of population in 1980</td>
<td>-0.090</td>
<td>-0.087</td>
<td></td>
<td></td>
<td>(0.052)*</td>
<td>(0.052)*</td>
</tr>
<tr>
<td></td>
<td>(0.053)*</td>
<td>(0.052)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dummy for landlocked country</td>
<td>0.562</td>
<td>-0.560</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.832)</td>
<td>(0.551)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.779)***</td>
<td>(2.129)</td>
<td>(11.917)***</td>
<td>(10.651)</td>
<td>(9.934)**</td>
<td>(8.139)</td>
</tr>
<tr>
<td>Observations</td>
<td>66</td>
<td>68</td>
<td>66</td>
<td>68</td>
<td>66</td>
<td>68</td>
</tr>
<tr>
<td>Instruments</td>
<td>UK legal origin; Log population density in 1500</td>
<td>UK legal origin; Log population density in 1500</td>
<td>UK legal origin; Log population density in 1500; interaction between them</td>
<td>UK legal origin; Log population density in 1500; interaction between them</td>
<td>UK legal origin; Log population density in 1500; interaction between them</td>
<td>UK legal origin; Log population density in 1500; interaction between them</td>
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</tbody>
</table>

Notes: Robust standard errors in parentheses; * significant at 10% level, ** significant at 5% level, *** significant at 1% level.
Table A1. Summary statistics of main variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of observations</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Min</th>
<th>Max</th>
<th>Percentiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean FDI attractiveness, 1991-2005</td>
<td>85</td>
<td>-0.59</td>
<td>1.80</td>
<td>-4.97</td>
<td>3.78</td>
<td>-3.32</td>
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<tr>
<td>Log GDP per capita, 2003</td>
<td>88</td>
<td>6.91</td>
<td>1.42</td>
<td>4.44</td>
<td>10.47</td>
<td>4.78</td>
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<tr>
<td>Constraints on the executive, average 1990s</td>
<td>87</td>
<td>4.28</td>
<td>1.86</td>
<td>1.00</td>
<td>7.00</td>
<td>1.00</td>
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<tr>
<td>Index of legal procedural complexity</td>
<td>70</td>
<td>5.94</td>
<td>1.54</td>
<td>2.90</td>
<td>9.03</td>
<td>2.92</td>
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<tr>
<td>British legal origin</td>
<td>88</td>
<td>0.39</td>
<td>0.49</td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Log population density in 1500s</td>
<td>84</td>
<td>0.53</td>
<td>1.61</td>
<td>-3.83</td>
<td>4.61</td>
<td>-2.44</td>
</tr>
</tbody>
</table>