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Demand for Contract Enforcement and Gains from Trade

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Demand for Contract Enforcement and Gains from Trade*

e ects of institutions that support exchange upon economic prosperity. We explore the reverse. We ask under what conditions the existence of potential gains from trade can generate a demand for institutions that enforce contracts. In addition, we ask

Having established the conditions under which there exists a willingness to pay

'impersonal exchange' in pre-modern Europe to the emergence of Genoa as a state. Dixit (2004) surveys some more contemporary cases of economic governance. In addition, there is a literature that interprets certain types of organized crime as "a form of governance of the illegal marketplace." ⁴ More recently, the example of Somalia ⁵ illustrates the variety of possible modes of economic governance that can arise in the absence of a well-functioning state.

In spite of this variety, North (1984) and more recently Acemoglu and Johnson (2003) o er a way to distinguish between two broad classes of economic governance: property(c)-329y w0(ii)-327.8(r6.4(i)-74p)g5e-38384ra.4(i)c(u)5.-3914(s)-64(g)-322.42(utt

beneficial. Moreover, in Dixit (2003), interactions involve a PD with fixed payo s, so that the outcome of a given match bears no direct consequence for the future payo s of either agent. By contrast, in our setup the value of bringing a tradeable good to a marketplace is determined in equilibrium, depending on the frequency of contract violations, which, in turn, depends on the enforcement technology available to the third-party. Consequently, interactions may or may not have the payo structure of a PD in our model in equilibrium.

In related work, Moselle and Polak (2001) develop a model in which welfare depends on the level of property rights, which in turn is determined by the behavior of the (potentially predatory) state. Unlike their model, in our model all interaction between agents is voluntary: thus, following the terminology of North (1984) and Acemoglu and Johnson (2003), their paper is about property rights whereas ours is about contract enforcement. Moreover, our model is dynamic. The possibility that the agents' goods may have a future use is critical to the results, and the discount factor turns out to playl oorytto7he(e9.6(to)-1(esu)6lat49l)-385(ut)-nship9.6(7h)6b.7(o)t97.9(en)6.6 vid.9(8)-0.7(1)5.1(4)-338.7(i)-2gai5.3(7(i)-2f7(1)-31om3(709)-3.3(1)10r5d(4)-338.2TJ1.4516f0.90(o)3

 $th 4h 6t 9 \text{(4l) 450} \text{(3E)} \text{(5i) 15i} \text{(5i) 25i} \text{(3i) 15i} \text{(5i) 25i} \text{(3i) 15i} \text{(5i) 25i} \text{(3i) 15i} \text{(3i) 25i} \text{(3i) 15i} \text{(3i) 25i} \text{(3i) 25$

then receives an opportunity for a mutually beneficial project as described below. When an agent uses (or loses) her good, she leaves the market and is replaced by another agent. If after a match an agent retains her good, she is matched anew the following period.

Matches have two stages. In the first stage, the pair may sign a

Equilibrium under anarchy 10 is straightforward. Taking the proportion of traders as given, an agent has to choose her best action. If she opts to trade, the payo is . On the other hand, if the agent robs and the partner chooses to trade, she earns and retains her good for continuation payo in the following period. Thus, the latter encounter yields the value of = + Finally, if both agents simultaneously attempt to rob, she expects to receive $\frac{1}{2}$, as she has a chance of a half to capture the possession of the other, while retaining her own. In this case, the payo conditional on the match is $+(1-)\frac{1}{2}$

of the transgression, particularly in the case of economic crimes. The second is when () = is a constant. This better describes cases in which the punishments are bounded by cultural norms or technological constraints.¹²

Parameter may be interpreted as reflecting limitations in the technology of surveillance and forensics. Probability of a successful enforcement might also depend on the structure of the internal organization of the enforcement agency, which we take as given. As mentioned in the introduction, we call the quality of institutions, and say that the agency is characterized by a () pair. We will describe equilibria under all possible combinations (), which we denote the supply of enforcement, and determine economic value generated by each combination. To rephrase, we take "production technology" as given and determine enforcement demand for each level of output.

In the presence of the enforcement agency the payo s change. Let ^g be the value of her tradeable to an agent who has signed a trading contract. Now, an agent who chooses trade and is matched with another who chooses rob earns ^g in expectation, as her good is reinstated if the violation (by her partner) is detected. If she meets a fair trader, the payo is as before. Hence, the expected payo to trading is

$$(trade) = + (1 -)$$

The payo to rob now takes into account that theft may be observed. If detected, an agent must pay the cost . Thus, if her partner trades, she earns $^g \equiv (1-)($

(rob) =
$$^{g} + (1 -) \left[\frac{1}{2} \quad ^{g} + \frac{1}{2} \quad ^{g}\right]$$
 (2)

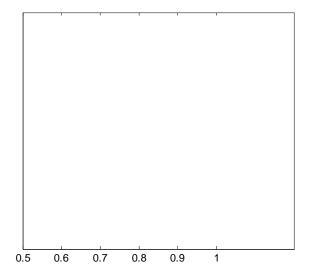
Finally,

$$g = \max\{ (trade) (rob)\}$$
 (3)

4 Exogenous Trading Contracts

The following proposition describes the structure of equilibria in this model. For extreme values of punishment, either su-ciently high or su-ciently low, an equilibrium is always unique: all agents trade or all of them choose to rob. For intermediate values of punishments, there are interior equilibria, in which some agents rob and the rest choose to trade. Importantly, the boundaries that describe the range of punishments for which interior equilibria exist vary with the parameters. It is this dependence that we will exploit later. Denote the parameters of the model by = ().

Proposition 1



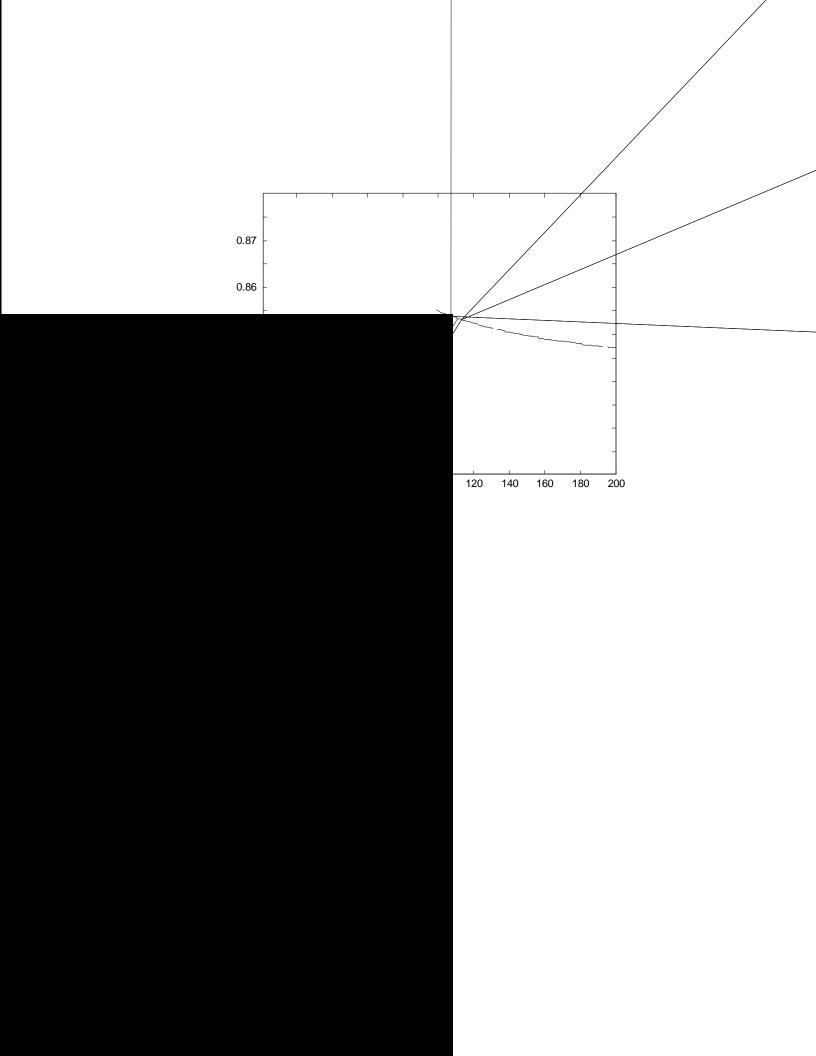
 * ($\,$) represents an upper bound on the economic value created by endorsing contracts, provided this value is positive. 14

5.1 Existence

5.2 Properties of the Demand

In the introduction we asked: how does the willingness to pay for contract enforcement
services depend on the potential gains from trade? Provided the punishment fits the
crime, the relationship is positive.

Proposition 4 Suppose pun	ishment is pro	oportional: () = If an eq	uilibrium
with contracting exists, then	*() is inc	creasing in the	e gains from trade	
The reason for the result i	sthat, when	() = , th	en the fraction of to	raders or



to verify that the structure of the equilibria (under symmetric contracts) does not change in that case, although more severe punishment is needed to induce trading behavior. This is intuitive as, under this alternative punishment scenario, theft leads to consumption by both even when it is detected, which tips the balance in favor of theft and decreases the equilibrium value of .

Second, our model assumes the existence of property rights, in the sense that all agreements between private agents are reached voluntarily, even if these agreements are not necessarily followed in equilibrium. If property rights do not hold, however, it may be that agents can be coerced

ment technology as given. Still, Proposition 3 suggests that, provided the gains from trade are high enough, there might be profits to be earned from the provision of enforcement services. The fees that might be charged for notarization would depend on the structure of the market for enforcement itself. Nonetheless, since participation is voluntary, there may still be surplus for the agents in the interval $[0 \ ^*(\)]$. For example, if the enforcement market is contestable and entry costs are low, then the profi

Proposition 8 Assume that 1 2 0 $_$ so that $_{\rm H}$ is well de*fi*ned. Assume $^{\rm D}$ () so that the demand for enforcement is positive. Then * is concave in and in

Now suppose that the agency is a monopolist and is capable of selecting , subject to a standard strictly convex cost function. Note that if __, then no contracts are breached, so that $_{\rm H}=1$ in which case * is constant with __ It implies that ${\rm HvRH\tilde{a}Ra\check{a}S}$ CRarage Market Market Rarage Normal Selection . So that $_{\rm H}=1$ in which case * is constant with __ It implies that ${\rm HvRH\tilde{a}Ra\check{a}S}$

6.4 Concluding Remarks

Models of institutions resulting from agent interaction tend to concentrate on property rights institutions. In this paper, we define and study the value created by contracting institutions. To this end, we develop a model of contracting and exchange, in which agent interactions are subject to a voluntary participation constraint. Agents choose whether to notarize their contracts in order to commit themselves to trade, even though they may decide to break their promises later. As a result, trade may be facilitated by contracting institutions, and the exchange value of goods may rise as a result. We then use the model to ask whether the presence of potential gains from

respectively

$$_{t}^{g}(\ ;\)=\frac{1-(1-)}{1-(1-)}$$

$$\int_{\Gamma}^{g} (;) = \frac{(+ 1) ((1 -) -)}{(1 -) (1 -) + 2(1 -)}$$
(5)

so that the value of a tradeable good introduced in the text, see (3) is then

$$g = \begin{cases} & \int_{t}^{g} (1; \cdot) & \text{if } = 1 \\ & \int_{t}^{g} (0; \cdot) & \text{if } = 0 \\ & \int_{t}^{g} (\cdot; \cdot) & \int_{t}^{g} (\cdot; \cdot) & \text{otherwise} \end{cases}$$

Let

$$(;) = ()[{}_{t}^{g}(;) - {}_{r}^{g}(;)];$$

$$() \equiv ((1-)(1-)+2(1-))(1-(1-))$$

$$(6)$$

Note that 0, so the sign of (;) coincides with the sign of the dierence g(;) - g(;): hence we concentrate upon finding roots of g(;).

$$(;) = {}^{2} F() + F() + F_{)f+}$$

Remark 2 Since $_{\rm H}$ 0 $_{\rm H}$ 0, the upper root of is positive, $_{\rm =}$ () 0 i $_{\rm H}$ 0 which is true whenever $_{\rm L}$ where $_{\rm L}$ is the lower root of the quadratic polynomial

$$() = +1 + i 6 - 42 - 6c + 2 i 5 - 82 + 43 + 1;$$

It is easy to check that $_{L}\in (0\ 1)$ provided 1 as (1) 0 and (0) 0

Proof. The two roots of the polynomial (;) are

$$_{L}() \equiv \frac{-_{F}() + p_{--}}{2_{F}}$$

In the environment with endogenous contracts, if agents agree to a trading contract, then $(\)$ 0 which reduces to

In this event, $\;\;$ is increasing in the gains from trade because it is linear in $\;\;$ (for a fixed $\;$)

Observe that _ 1 Moreover, provided _ the demand () is positively related to the gains from trade, keeping constant, $_{\rm G}^*$ () 0 Then proposition (4) stems from homogeneity of see Remark 1 Lastly, we have to demonstrate that condition _ is equivalent to requiring $^{\rm D}$ ()

It is easy to check that the derivative of $\,$ with respect to $_{\rm H}$ is $-\sqrt{_{\rm F}}$ where $_{\rm F}$ = $_{\rm F}^2$ -4 $_{\rm F}$ $_{\rm F}$ Therefore, $_{\rm H}$ is decreasing with $\,$ Moreover,

$$\frac{H()}{F} = \frac{G(H)}{\sqrt{F}} = 0$$
 (22)

similarly,

$$\frac{H()}{\sqrt{F}} = \frac{C(H)}{\sqrt{F}} = 0 \tag{23}$$

■ > ! '%! 'T s '%! 'T s

so it is homogenous of degree two in i.e., $_{F}$ () = 2 $_{F}$ () for any 0 provided 0 By Euler's formula, 2_{F} () = $\frac{_{F}}{_{F}}$ () +

To support the first claim notice, that $_{\rm =}(\)=\ _{\rm H}$ ($\)$ where $_{\rm H}$ ($\)$ is the upper root of $\ (\)$

$$(\qquad) \equiv \frac{F(\qquad)}{2} \equiv \qquad (34)$$

Thus

$$() = {}^{2} H + {}^{H} + {}^{H}$$
 (35)

$$_{H} = {}^{2}(+1)^{i}2(1-)^{2}-(-2 +1)^{2}$$

always above $_$ In the other case, for $_$ big enough $_{\rm H}$ will reach $_$ at which the demand is zero. Observe that the sign of $_{\rm G}$ $_$ depends on $_$ and $_$:

$$G = 2(1-)\frac{()}{(+-2)^2}$$
 (40)

In the relevant range of

the derivative — () can be shown to be negative

parameters, as well as on the action that agent chooses in period This dependence, however, is not important for the result. Indeed, with constant growth,

Hence the structure of the model is identical to one without growth when gains to trade are $_0$ every period and the discount factor is replaced with , and hence the condition $_1$ must be satisfied. \blacksquare

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