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# Decentralisation and the perceived quality of institutions

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## Abstract

In a simple two-sector model of economic exchange it is shown that decentralisation may fail to be Pareto-improving if traders' perception of formal contract enforcement falls short of its actual quality.
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## 1. Introduction

There is now considerable evidence which suggests a positive correlation between the quality of institutional infrastructure that supports market exchange and the degree of success of economic reforms (e.g. EBRD, 2000, pp. 23–29; IMF, 2000, pp. 134–137; World Bank, 2002). In addition to formalising this argument in a simple model of economic exchange, this note also emphasises the importance of *perceived institutional quality*. In the model presented here, bilateral contracting is undertaken in one of two sectors: 'state' or 'market'. The decentralised nature of contracting in the market sector is assumed to result in a larger trading surplus at the expense, however, of greater scope for unchecked opportunistic behaviour, as compared to the state sector[1].

A loss of decentralised trading contracts is then shown to arise when institutions of formal contract enforcement are, *or are perceived to be*, inadequate. This prediction, which is consistent with available

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[1] This may be, for example, because legal provisions for private contracting are incomplete or confusing, as in many transition economies (Gray, 1993; Pistor, 1996; Rubin, 1997).

survey evidence[2], is driven by legal and informational factors and has the flavour of a 'lemons' problem (Akerlof, 1970). It, therefore, constitutes an additional explanation of the output fall phenomenon in transition economies to those based on technological lock-ins and inefficient bargaining (Blanchard and Kremer, 1997) or costly search (Roland and Verdier, 1999).

## 2. Model

There are two equally sized large populations of risk-neutral players: buyers and sellers. In a one shot game, each player can sign one (and only one) contract: $(z, p(z))$ obligates the seller to deliver 1 unit of product of quality $z \in \{0, \underline{z}, \bar{z}\}$ $(0 < \underline{z} < \bar{z})$ for an up front payment of $p(z) \geq 0$ at a cost $c(z) \geq 0$ to the seller, where $p(0) = c(0) = 0$, $p(\underline{z}) = \underline{p}$, $c(\underline{z}) = \underline{c}$, $c(\bar{z}) = \bar{c}$, and $0 < \underline{c} < \bar{c}$. The net value from contracting is $U = z - p(z)$ to the buyer and $V = p(z) - c(z)$ to the seller; the outside options of all players are 0. All buyers are homogeneous. Any given seller is opportunistic with probability $\gamma \in (0, 1)$ or honest with probability $1 - \gamma$; the seller's type is private information. An honest seller never breaches his contract, an opportunist can choose compliance or breach. A breach is seller's failure to deliver the contracted quality.

The economy is divided into the market (or decentralised) sector of size $\mu \in (0, 1)$ and the state (or centralised) sector of size $1 - \mu$. The assignment of a seller to a sector is random, while buyers can choose the sector in which to trade. The two sectors (subscripted m and s) are distinguished by the following two factors. Firstly, the levels of quality contractible in each sector are $z_m = \{\bar{z}, 0\}$ and $z_s = \{\underline{z}, 0\}$ with $0 < \underline{z} - \underline{c} < \bar{z} - \bar{c}$, so that (ignoring the problem of enforcement) a total trading surplus from a contract on $z > 0$ is higher in the market (e.g. due to costs imposed by deficiencies of centralised information processing). Secondly, effectiveness of contract enforcement differs in the two sectors. It is perfect in the state sector (due to the centralised nature of contracting): any breach is remedied by *specific performance*, which forces the breaching seller to honour his contractual obligations. In contrast, market sector contracts are enforced with probability $\lambda \in (0, 1)$ by means of *reliance damages*, $d = p(z)$, from the breaching seller to his buyer. It is also assumed that (i) enforcement is invoked immediately after the contractual breach has occurred, (ii) litigation costs are zero, and (iii) dispute resolution is instantaneous.

The timing is as follows. (1) Nature determines the type of each seller and assigns every seller to a sector. (2) A buyer chooses the sector for contracting. (3) A buyer and a seller negotiate a contract. If $(\tilde{z}, p(\tilde{z}))$ is agreed, the buyer pays $p(\tilde{z})$. If no contract is agreed, each gets their outside option of 0. (4) The seller delivers $z$. (5) If $z \neq \tilde{z}$, then $(\tilde{z}, p(\tilde{z}))$ is enforced in line with the enforcement procedure prevailing in the sector. (6) Payoffs.

## 3. Analysis and multiple equilibria

The sequential game is solved by backward induction in pure strategies. The assumptions on the litigation process imply that at stage 5 the injured buyer will seek compensation with certainty.

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[2] The EBRD indices of extensiveness and effectiveness of legal transition (based on survey data) together with broad indicators of liberalisation and economic performance suggest that countries with a perception of legal inadequacy (i.e. where the measure of effectiveness lags behind that of extensiveness) tend to have a low degree of success with reforms (EBRD, 1999, pp. 44–47 and country assessments).

Consider the opportunistic seller's choice of compliance or breach of his contract at stage 4. The choice is non-trivial in the context of market contracting, since perfect enforcement of the state contract $(\underline{z}, \underline{p})$ ensures compliance, and therefore guarantees quality $\underline{z}$ and the expected payoffs $U_s(\underline{z}) = \underline{p} - \underline{c}$ to the buyer and $V_s(\underline{z}) = \underline{p} - \underline{c}$ to the seller. Let $q = \{0, 1\}$ denote the opportunistic sellers' equilibrium choice of compliance ($q = 1$) or breach ($q = 0$) at stage 4 when contracting on $\bar{z}$. The possibility of breach affects $p(\bar{z})$: because the buyer in the market cannot distinguish between the two types of sellers, the price she would be willing to pay must reflect the average quality. Let $\dot{p} = p(\bar{z})|_{q=0}$ and $\bar{p} = p(\bar{z})|_{q=1}$, then $\dot{p} < \bar{p}$. For a non-trivial outcome of the game assume that in the absence of enforcement problems contracting for $z > 0$ is worthwhile in both sectors:

**Assumption 1**

$$\underline{c} < \underline{p} < \underline{z} \quad \text{and} \quad \bar{c} < \bar{p} < \bar{z} \tag{A1}$$

Under the enforcement regime $\lambda$ and $d = p(\bar{z})$, the expected payoffs from $(\bar{z}, p(\bar{z}))$ to the buyer and each type of seller, superscripted by $\gamma$ and $1 - \gamma$, are:

$$U_m(\bar{z}, \lambda \mid q) = [1 - \gamma(1 - q)] \cdot \bar{z} - [1 - \lambda\gamma(1 - q)] \cdot p(\bar{z}), \tag{1}$$

$$V_m^{\gamma}(\bar{z}, \lambda, q) = [1 - \lambda(1 - q)] \cdot p(\bar{z}) - q \cdot \bar{c}, \tag{2}$$

$$V_m^{1-\gamma}(\bar{z}, \lambda|q) = p(\bar{z}) - \bar{c}. \tag{3}$$

The value of $q$ is chosen by an opportunistic seller to maximise his payoff in Eq. (2): the seller expects to retain payment $p(\bar{z})$ unless he breaches and the contract is enforced (probability $\lambda(1 - q)$), while he expects to incur the cost of supplying $\bar{z}$ only if he complies. Given the value of $q$, the buyer in Eq. (1) expects to get $\bar{z}$ in all cases except when the contract is breached (probability $\gamma(1 - q)$) and pay the price $p(\bar{z})$ unless the breached contract is enforced (probability $\lambda\gamma(1 - q)$); an honest seller complies and thus expects Eq.(3). Given $p(\bar{z})$, an opportunistic seller prefers compliance if $V_m^{\gamma}(\bar{z}, \lambda, q = 1) > V_m^{\gamma}(\bar{z}, \lambda, q = 0)$; while both a buyer and an honest seller will sign $(\bar{z}, p(\bar{z}))$ if $U_m(\bar{z}, \lambda|q) > 0$ and $V_m^{1-\gamma}(\bar{z}|q) > 0$.

The buyer's choice of sector at stage 2 is governed by the largest expected payoff which can be obtained in a sector, given the probability of successfully finding a seller in that sector. Let $f \in [0, 1]$ be the fraction of buyers who choose the market sector, and $\beta \in [0, 1]$ the probability that a given buyer chooses the market sector. Then the buyer's problem is:

$$\max_{\beta} \left[ \beta \cdot \min\left\{\frac{\mu}{f}; 1\right\} \cdot \max\{0, U_m\} + (1 - \beta) \cdot \min\left\{\frac{1 - \mu}{1 - f}; 1\right\} \cdot U_s \right]. \tag{4}$$

**Claim 1.** *In equilibrium with market contracting, a buyer is indifferent between the two sectors, demand is balanced in each sector, while*

$$\bar{p} = \Delta z + \underline{p} \quad \text{and} \quad \dot{p} = \frac{\bar{p} - \gamma\bar{z}}{1 - \lambda\gamma}. \tag{5}$$

**Proof:** Let $q = 1$ (the argument for $q = 0$ is analogous) and consider (a) $\mu < f$, (b) $\mu > f$, and (c) $\mu = f$. Since all buyers are identical, from Eq. (4) we have:

$$(a) \Rightarrow \quad f = \beta = 1, \qquad \mu(\bar{z} - \bar{p}) > \underline{z} - \underline{p} \qquad \Rightarrow \bar{p} < \bar{z} - (1/\mu)(\underline{z} - \underline{p}),$$

$$(b) \Rightarrow \quad f = \beta = 0, \qquad \bar{z} - \bar{p} < (1 - \mu)(\underline{z} - \underline{p}) \quad \Rightarrow \bar{p} > \bar{z} - (1 - \mu)(\underline{z} - \underline{p}),$$

$$(c) \Rightarrow \quad f = \mu, 0 < \beta < 1, \quad \bar{z} - \bar{p} = \underline{z} - \underline{p} \qquad\qquad \Rightarrow \bar{p} = \Delta z + \underline{p}.$$

Since $\bar{z} - (1/\mu\{\})(\underline{z} - \underline{p}) < \Delta z + \underline{p} < \bar{z} - (1 - \mu)(\underline{z} - \underline{p})$, then $\bar{p}$ is lower under (a), or higher under (b), than it is under (c). Thus, if (a) then the sellers could increase $\bar{p}$ slightly and still get the buyer to trade; or if (b) then $\bar{p}$ can be reduced so that sellers who previously were unable to find a buyer can now do so. It follows that neither (a) nor (b) is an equilibrium. If (c) then $\bar{p}$ is at the level which gives the buyer the same expected payoff from either market or state contracting, and $\bar{p}$ cannot be changed without changing the demand. □

Claim 1 implies that in equilibrium with market contracting $\mu$ buyers will be located in the market and $1 - \mu$ in the state sector. Three types of equilibria, as listed in Table 1, are feasible in this game.

**Proposition 1:** *Assume* (A1) *and let* $\lambda^{\#} \equiv [\gamma\bar{z} - (\bar{p} - \bar{c})]/(\gamma\bar{c})$ *and* $\lambda^{\flat} \equiv \bar{c}/[\bar{p} - \gamma(\bar{z} - \bar{c})]$, *where* $\bar{p} = \Delta z + \underline{p}$. *Then there exists an equilibrium of the game.*

(i) *The equilibrium is unique if* $\lambda > \lambda^{\flat}$ (SE), $\lambda^{\#} < \lambda \leq \bar{c}/\bar{p}$ (IE), *or* $\lambda \leq \min\{\lambda^{\#}; \bar{c}/\bar{p}\}$ (WE).
(ii) *Else, SE and IE co-exist if* $\lambda^{\#} < \lambda \leq \lambda^{\flat}$, *or SE and WE co-exist if* $\lambda \leq \min\{\lambda^{\#}; 1\}$.

**Proof:** (Sketch): Firstly, the necessary conditions for each of the three equilibria are established by examining the players' equilibrium behaviour. It can be checked that SE exists if $\lambda > \bar{c}/\bar{p}$, IE exists if $\lambda^{\#} < \lambda \leq \lambda^{\flat}$, and WE exists if $\lambda \leq \min\{\lambda^{\#}; 1\}$. Secondly, it is verified that $\lambda^{\#} \in [0, 1]$ when $\gamma \in [\frac{\bar{p} - \bar{c}}{\bar{z}}, \frac{\bar{p} - \bar{c}}{\bar{z} - \bar{c}}]$, $\lambda^{\flat} \in [\bar{c}/\bar{p}, 1]$ when $\gamma \in [0, \frac{\bar{p} - \bar{c}}{\bar{z} - \bar{c}}]$, and $\lambda^{\flat} > \lambda^{\#}$ when $\gamma \in (0, \frac{\bar{p} - \bar{c}}{\bar{z} - \bar{c}})$. Multiple equilibria arise where the feasible regions defined by the necessary conditions for each equilibrium overlap, namely $\bar{c}/\bar{p} < \lambda \leq \min\{\lambda^{\flat}, 1\}$. □

Fig. 1 illustrates Proposition 1 and suggests that part (i) is intuitive. For SE to prevail, the quality of market institutions, $\lambda$, must be sufficiently high. If $\lambda$ is relatively low, then for small enough $\gamma$ the unique equilibrium is IE, and otherwise it is WE: if the proportion of opportunistic sellers is sufficiently large, $\dot{p}$ must fall below $\bar{c}$ in order to compensate buyers for the high probability of losing the up front payment.

Table 1
Description of equilibria

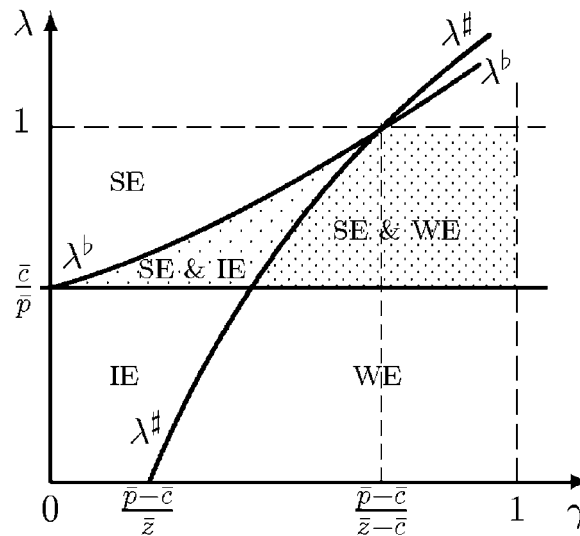| Equilibrium | Contracting in which sector? | Economy trade surplus |
|---|---|---|
| Strong enforcement (SE), $q = 1$ | State and market | $(1 - \mu)(\underline{z} - \underline{c}) + \mu(\bar{z} - \bar{c})$ |
| Intermediate enforcement (IE), $q = 0$ | State and market | $(1 - \mu)(\underline{z} - \underline{c}) + \mu(1 - \gamma)(\bar{z} - \bar{c})$ |
| Weak enforcement (WE), $q = 0$ | State only | $(1 - \mu)(\underline{z} - \underline{c})$ |

Fig. 1. Equilibria of the game.

This price, of course, would drive away the honest sellers since it will not cover their cost of supplying $\bar{z}$. The key to the intuition behind part (ii) is the buyers' belief about the equilibrium value of $q$ when both $q = 1$ and $q = 0$ are feasible (the shaded area in Fig. 1). If buyers believe that all sellers comply in equilibrium ($q = 1$), then they would be willing to pay $\bar{p}$, which makes it unprofitable for a given opportunistic seller to unilaterally deviate from $q = 1$: the loss of $\lambda \bar{p}$ from his breach is greater than the cost of compliance $\bar{c}$. In contrast, if buyers believe that $q = 0$ then they would be willing to contract in the market only if the agreed price is $\dot{p} < \bar{p}$. A unilateral deviation from $q = 0$ is then again unprofitable: in IE the deviating opportunistic player expects to get $\dot{p} - \bar{c}$ which in the sparsely shaded area is not larger than his no deviation payoff of $(1 - \lambda)\dot{p}$ because $\lambda \leq \lambda^\flat$. In WE, buyers and (honest) sellers are not able to agree on the same level of $\dot{p}$ and therefore market contracting breaks down altogether. The analysis suggests that although in the shaded area SE is feasible, the belief of $q = 0$ leads to WE and a break down in market contracting when $\gamma$ is relatively large (dense shading), or to IE and undeterred breach of some market contracts when $\gamma$ is relatively small (sparse shading)[3].

The model presented here suggests that decentralisation of the economy when the quality of formal contract enforcement is, or perceived to be, poor leads to a welfare loss: an increase in $\mu$ when (i) either $\lambda$ is low, or (ii) $\lambda$ is relatively high but it is believed that $q = 0$, leads to a decrease in the economy surplus. The policy implications suggested by the analysis are thus in both strengthening the institutions (e.g. by improving the legal infrastructure), as well as improving the perception of the effectiveness of those institutions (e.g. by publicising the new laws and the authorities' commitment to law and order).

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[3] Russia provides an excellent example of this kind: despite relatively high measures of liberalisation and legal reforms (the extensiveness of statutory legal protections in Russia were "some of the world's highest by 1998" (World Bank, 2002, p. 64), the *perceived ineffectiveness* of commercial law (EBRD, 1999, pp. 260–261) contributed to negative growth rates and the epidemic of crime in the late 1990s.

## Acknowledgements

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