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ON CORRUPTION AND INSTITUTIONS IN DECENTRALIZED ECONOMIES

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Abstract. This paper presents a model of opportunistic behaviour in decentralized economic exchange and considers the impact of inadequate institutional framework of formal contract enforcement on economic performance. It is shown that (i) when the number of cheating traders is sufficiently large, inadequate institutions result in a loss of decentralized trading contracts, (ii) an adequate institutional framework, while being necessary for the attainment of a Pareto optimal outcome, may not be sufficient if traders *perceive* it as inadequate; and (iii) sufficiently good formal enforcement provisions help deter contractual breach in enviroments with corrupt and powerful enforcers.

Keywords: Formal contract enforcement, perceptions, transition economies.

JEL C70, D82, K42

1 Introduction

This paper puts forward a simple framework for analyzing the impact of institutions on the implementation of reforms in CEE.[2] The institution under study is formal contract enforcement which is widely regarded as an important ingredient of well-functioning markets. In the model I construct, an economic exchange is subject to opportunistic behaviour and may be undertaken in one of two sectors, labelled 'state' and 'market'. The two sectors differ in their trading potential as well as the effectiveness of contract enforcement. Trade in the state sector is less efficient than in the market (when measured in terms of an achievable trade surplus), but the state contract enforcement is more effective in curtailing opportunistic behaviour. In contrast, the market sector is able to deliver a higher trade surplus, but due to less effective deterrence of opportunistic behaviour, the higher trade surplus may fail to materialize.

It is shown in this simple setting that inadequate or incomplete institutional framework necessarily leads to a loss of decentralized trading contracts.[3] Furthermore, an adequate institutional framework (specifically, a contract enforcement system which ensures a sufficiently high probability of punishment for contractual breach), although conducive to achieving a Pareto optimal outcome, may not be sufficient: agents' perceptions of the inadequacy of the legal system may force the reforming economy into an inferior outcome even when the level of enforcement provisions is relatively high. In the stylized setting of this paper, the perception of the inadequacy of the legal system arises due to a negative enforcement externality: the higher the proportion of non-complying agents the more difficult it is to detect non-compliance. In such a case, the perception of a legal void leads to the highest level of undeterred opportunistic behaviour in the economy which, if combined with a large number of opportunists, forces honest agents to avoid the market altogether. The higher the enforcement externality, the higher the level of enforcement required to achieve a Pareto optimal outcome. For a sufficiently high enforcement externality, the perception of legal inadequacy is most damaging: even the most extensive legal provisions will not suffice to achieve the good equilibrium, because

the fixed resources devoted to enforcement are spread too thinly for the number of non-complying agents.

These predictions are in line with observed economic and institutional performance in CEE over the last decade. Countries where a relatively good legal and other institutional infrastructure is perceived by the economic actors as adequate (e.g. the Czech Republic, Hungary, Poland and Estonia) tend to have a high degree of success with liberalization and reforms (EBRD 1999, IMF 2000). At the same time, countries with a perception of legal inadequacy tend to have less stable economic environment and an unsatisfactory progress with reforms. Russia provides the most striking example: despite relatively high measures of economic liberalization, the perceived inadequacy of extensive legal provisions—which in 1998 according to the EBRD legal transition index measured 3.7 for extensiveness but only 2 for effectiveness, on the scale of 1 (worst) to 4 (best)—is an important factor behind the negative growth rates and the epidemic of crime in the late 1990s (EBRD 1999, pp. 260–1).[4] The analysis therefore suggests that some of the government's reform effort in transition should be directed towards both improving the adequacy as well as the perception of adequacy of the legal system to support markets.[5]

Another set of predictions derived in this paper relates to corruptibility of enforcers. Observers of the transition experience agree that wide-spread, and in some cases endemic, corruption played a critical role when reform efforts in CEE were deemed unsatisfactory.[6] I therefore supplement the analysis of contract enforcement in a decentralized setting with a study of corruption.[7] The findings presented here suggest that, other things equal, a Pareto optimal outcome is more difficult to achieve when enforcers are corruptible. In such a case, the strong enforcement of contracts must be complemented with a high enough number of honest enforcers, for the good equilibrium to exist. The analysis also uncovers the following surprising but intuitive result: when all enforcers are corrupt and enjoy strong bargaining power, but the enforcement institution itself is relatively effective in terms of a sufficiently high probability of breach detection, the Pareto optimal outcome exists as a unique equilibrium. In such a case, the opportunistic behaviour of suppliers is

deterred because it is cheaper to honour the contract than engage in a bribing game with a corrupt enforcer. The analysis therefore suggests that strong institutions (e.g. adequate legal framework for a smooth functioning of markets) have an even greater importance in the economy with a high corruption level.[8]

The model presented here helps explain markedly different reform performance of apparently quite similar CEE countries. It contributes to the growing literature which stresses the importance of (law enforcement) institutions in transition: e.g. Berglöf and Bolton (2002b), Hoff and Stiglitz (2004), Roland and Verdier (2003) and Sonin (2003), among others. In these models, a combination of a law enforcement externality (the relative attractiveness of law abiding behaviour, given the behaviour of other agents in the economy) and other economic factors (listed below) leads to multiple equilibria, thus making it possible for a good outcome with strong incentives for an individual to support the rule of law and undertake productive activities at an efficient level (e.g. build value of an asset rather than strip it, engage in production rather than rob others, undertake a productive investment project rather than engage in rent-seeking, etc.) to coexist in the same parameter space with an outcome in which these incentives, and consequently the economy's performance, are poor. These other factors, which complement the enforcement externality, include the 'tax compliance externality' or government (in)ability to raise revenues for financing the establishment of a new market-friendly legal system (Roland and Verdier 2003), a 'voting externality' whereby an individual voting decision and positioning in a political spectrum is affected by other agents' actions and voting decisions (Hoff and Stiglitz 2004, Berglöf and Bolton 2002b), the extent of income inequality and wealth bias among voters (Berglöf and Bolton 2002b, Sonin 2003), the incentives for rent-seeking (Sonin 2003), and the degree of equitability in property rights allocation (Polishchuk 1999). In contrast with the models studied in the above papers, the present work highlights the importance of market institutions in transition by proposing a simple model based on bilateral contracting under possibly imperfect contract enforcement.

Implications of corrupt behaviour of agents entrusted with providing formal con-

tract enforcement are also analyzed by Mui (1999) in a model of incomplete contracting with one-sided relationship-specific investment, pre- and post-trial renegotiation of the original contract, a corrupt profit-maximizing judge and an uncorrupt supreme authority that monitors court rulings. Focusing explicitly on judicial favouritism—the corrupt enforcer's preference to accept bribes from a litigant who is better-connected to the political elite (which translates into a reduced probability of being caught accepting bribes)—Mui (1999) finds that judicial corruption in this setting leads to inefficient investment incentives regardless of the investing party's connections (although the efficiency loss is more severe if the investing party's connectedness is worse than that of her contractual partner). Essentially, the investing party, who rationally expects to pay a significant part of the trade surplus to the corrupt judge in exchange for the enforcement of the original contract, will be prepared to avoid the litigation by transferring this amount to the contractual partner instead at the pre-trial renegotiation stage. In contrast, the complete contracting model of economy-wide bilateral trade in the present paper is set up with a focus on inadequacy of legal enforcement provisions for facilitating anonymous exchange.

The rest of the paper is organized as follows. The simple model is introduced and analyzed in section 2. Two main extensions of the simple model, namely an enforcement externality and corruptibility of enforcers, are considered in section 3. The importance of institutional quality in environments with high corruption is further analyzed in section 4, where the assumptions of the basic set-up are relaxed to allow costly litigation, punishment of corrupt enforcers and two-sided contractual breach. Comparative statics results and their policy implications are discussed in section 5. Concluding remarks are supplied in section 6.

2 A simple model

2.1 Assumptions and timing

There are two equally sized large populations of risk-neutral players: buyers and sellers. In a one shot game, a buyer and a seller negotiate a contract $(z, p(z))$ whereby

the seller agrees to deliver one unit of a product embodying a specified value of a quality parameter, $z \geq 0$, and the buyer agrees to pay the price $p(z) \geq 0$ up front.[9] The net value that the buyer obtains from the product is given by $U = z - p(z)$. Provision of quality costs $c(z) \geq 0$ to the seller who gains $V = p(z) - c(z)$ if the contract is agreed. Three levels of quality are considered: high ($z = \bar{z}$), mediocre ($z = \underline{z}$), and low ($z = 0$), with $\bar{z} > \underline{z} > 0$. The corresponding costs and prices are: $c(\bar{z}) = \bar{c}$, $c(\underline{z}) = \underline{c}$, $c(0) = 0$, with $\bar{c} > \underline{c} > 0$; and $p(\bar{z}) = \bar{p}$, $p(\underline{z}) = \underline{p}$, $p(0) = 0$. Also, $\bar{z} > \bar{c}$ and $\underline{z} > \underline{c}$, so that signing a contract for quality $z > 0$ is worthwhile ex ante. Each player can only sign one contract. The outside options of buyers and sellers are zero.

All buyers are homogeneous.[10] The population of sellers contains two types: opportunistic in proportion $\gamma \in (0, 1)$ and honest in proportion $1 - \gamma$. The seller's type is his private information. An honest seller never fails to honour the contract (say, due to a large 'psychic' cost of breaking promises), while an opportunist chooses whether to abide by the contract depending on the extent of contract enforcement. A contract is breached if the seller fails to deliver the contracted quality.

The economy is divided into two sectors: the market (or decentralized) sector of size $\mu \in (0, 1)$, and the state (or centralized) 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 $z_s = \{\underline{z}, 0\}$. The assumption captures the idea that the sellers operating in the state sector cannot beat the market sellers in the level of contractible product quality (for $z > 0$) due to, say additional costs of bureaucratic procedures on writing contracts in the state sector (or other deficiencies imposed by centralized information processing). Furthermore, $\bar{z} - \bar{c} > \underline{z} - \underline{c}$, so that (ignoring the problem of enforcement) a total trading surplus from a market contract is higher than that from a state contract.

The second factor which distinguishes the two sectors is the effectiveness of contract enforcement. Enforcement in the state sector is certain and facilitated by *specific performance*: the breaching party is forced to do exactly as the contract

specifies. In contrast, enforcement in the market sector is uncertain and enacted by means of *reliance damages*: with probability $\lambda \in (0,1)$ the buyer receives from the breaching seller a monetary payment, $d > 0$, which makes the buyer as well off as if there had been no contract. These assumptions are motivated as follows. The sector with a high degree of centralization relies on commands in enforcement of contracts, as well as in undertaking of economic activity (Kroll 1987, Pistor 1996). Certainty of enforcement in the state sector, as opposed to its uncertainty in the market sector, reflects the observation that in a formerly planned economy the state sector legal provisions are highly developed and well understood, while those necessary for emerging markets are patchy, inadequate, and confusing (Gray 1993, Pistor 1996, Rubin 1997, EBRD 1999).[11] Additionally, it is assumed that (i) dispute resolution is instantaneous, (ii) enforcement is invoked immediately after the contractual breach, and (iii) litigation costs are zero.[12]

The timing of the game is as follows.

(1) Nature determines the type of every seller and assigns every seller to a sector.

(2) Each buyer chooses the sector in which to purchase the product.

(3) A buyer and a seller negotiate a contract. If they fail to agree, then each gets his/her outside option of 0. If the contract $(\tilde{z}, p(\tilde{z}))$ is agreed, the buyer pays $p(\tilde{z})$.

(4) The seller delivers the product of quality z.

(5) If a contract breach has occurred (i.e. if $z \neq \tilde{z}$), then the contract $(\tilde{z}, p(\tilde{z}))$ is enforced as follows: specific performance is enacted with probability 1 in the state sector, or a reliance damage measure is applied with probability λ in the market sector.

(6) Payoffs are realized.

2.2 Analysis of the simple model

Given the sequential nature of the game, the appropriate solution method is backward induction: having determined the best strategy for the quality choice by an opportunistic seller in each sector at stage 4, I consider the buyers' best strategy for their choice of contract at stage 3 and their choice of sector at stage 2 given sellers' choice at stage 4. The methodology for deriving all the results in the paper is standard, and the proofs of all propositions are therefore omitted. Costly provision of quality implies that the equilibrium quality in this setting will be determined by the proportion of opportunistic sellers and the extent of formal contract enforcement. The analysis is restricted to pure strategies. Also, contractual prices are assumed to be fixed in a way that makes a buyer and a seller willing to sign the contract:

Assumption 1 $\underline{c} < \underline{p} < \underline{z}$ *and* $\bar{c} < \bar{p} < \bar{z}$. (A1)

Note that buyers' choice of sector in stage 2 would in general lead to an excess demand for a given sector. Should this be the case, the buyer's success (or failure) in achieving her choice of sector will be determined randomly by Nature, since all buyers are identical. Moreover, I shall assume that any excess demand for a given sector is absorbed by the other sector: the buyer who is not successful in obtaining a contract in her preferred sector has the opportunity to contract in the other sector.[13]

When provision of quality is costly, an opportunistic seller in either sector prefers to supply a lower level of quality than contracted upon. Perfect contract enforcement in the state sector, however, forces opportunistic sellers to abide by the contractual terms and thus guarantees that the medium level of quality $\underline{z}$ contractible in the state sector is delivered. Consequently, perfect enforcement implies that the buyer in the state sector will optimally choose contract $(\underline{z}, \underline{p})$. The payoffs to the buyer and either type of seller are:

$$U_s(\underline{z}) = \underline{z} - \underline{p} \qquad \text{and} \qquad V_s(\underline{z}) = \underline{p} - \underline{c}. \tag{1}$$

Consider contracting under imperfect market contract enforcement. Denote by $q = \{0, 1\}$ an opportunistic seller's choice of breach ($q = 0$) or compliance with

$(q = 1)$ his contract $(\bar{z}, \bar{p})$. Under the enforcement regime λ with the reliance damage measure $d = \bar{p}$, the expected payoffs to the buyer and each type of seller, superscripted by γ and $1 - \gamma$, are:

$$U_m(\bar{z}, \lambda) = [1 - \gamma(1 - q)] \cdot \bar{z} - [1 - \lambda\gamma(1 - q)] \cdot \bar{p}, \quad (2)$$

$$V_m^{\gamma}(\bar{z}, \lambda) = [1 - \lambda(1 - q)] \cdot \bar{p} - q \cdot \bar{c}, \quad (3)$$

$$V_m^{1-\gamma}(\bar{z}, \lambda) = \bar{p} - \bar{c}, \quad (4)$$

if contract $(\bar{z}, \bar{p})$ is agreed, or 0 otherwise. In the above, q is set by the opportunistic seller so that (3) is maximized. Given the sellers' payoff-maximizing value of q, the buyer expects to obtain $\bar{z}$ in all cases except when she is matched with a breaching opportunist (with probability $\gamma(1 - q)$) and she expects to pay the price $\bar{p}$ up front unless the breached contract is enforced (with probability $\lambda\gamma(1 - q)$). An honest seller complies with his contract $(\bar{z}, \bar{p})$, and thus expects the payoff given by (4). An opportunistic seller expects to retain the up front payment $\bar{p}$ unless his breach is enforced (with probability $\lambda(1 - q)$), while he expects to incur the cost of supplying high quality only if he complies (with probability q). In deciding whether to contract or take her outside option when in the market sector, the buyer takes into account the sellers' optimal choice of q and chooses the larger of the two payoffs: $U_m(\bar{z}, \lambda \mid q)$ or 0.

The buyer's equilibrium choice of sector at stage 2 will depend on (a) the fraction of buyers who choose the market sector, and (b) the size of her payoff from the market sector contract vis-à-vis that from the state sector contract. Given that any excess demand for one sector is absorbed by the other sector, the equilibrium allocation of (identical) buyers across the two sectors—namely μ buyers in the market sector and $1-\mu$ buyers in the state sector—is, however, independent of an individual buyer's sector choice.[14]

Consider possible equilibria of the sequential game. Recall that opportunistic sellers in the market may choose to breach $(q = 0)$ or honour $(q = 1)$ their contract for quality $\bar{z}$. Also, seller of either type prefers contracting to no contracting by assumption. Buyers who end up in the state sector prefer contracting for $\underline{z}$ to

their outside option since $U_s(\underline{z}) > 0$, given the perfect enforcement of state sector contracts. Buyers who end up in the market sector prefer contracting for $\bar{z}$ to their outside option if $U_m(\bar{z}, \lambda \mid q) \geq 0$, or take their outside option if $U_m(\bar{z}, \lambda \mid q) < 0$. We therefore have three candidates for equilibria in this game and these are listed in Table 1.

Table 1: *Description of equilibria.*

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

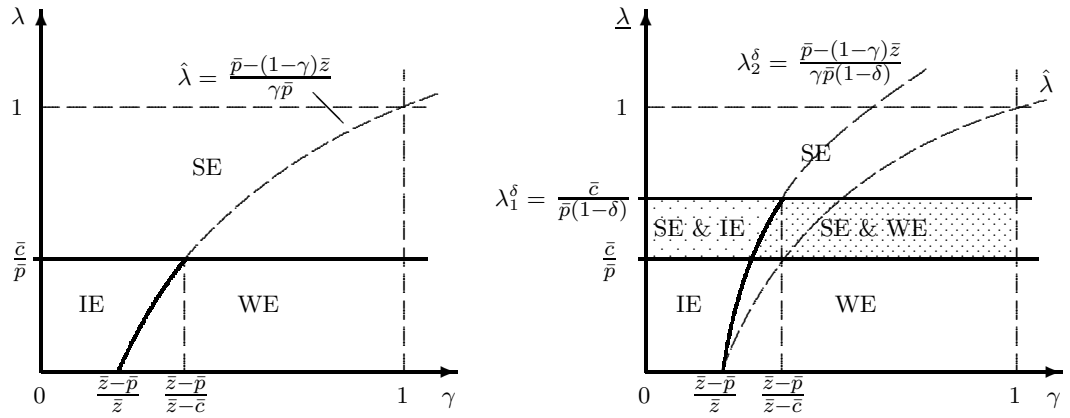
Which of these surpluses are attained in equilibrium is given by the following:

Proposition 1 *Assume (A1) and let* $\hat{\lambda} \equiv [\bar{p} - (1-\gamma)\bar{z}]/(\gamma\bar{p})$. *There exists a unique equilibrium of the game and it is (i) SE if* $\lambda \geq \bar{c}/\bar{p}$, *(ii) IE if* $\hat{\lambda} \leq \lambda < \bar{c}/\bar{p}$ *and* $\gamma < (\bar{z}-\bar{p})/(\bar{z}-\bar{c})$, *or (iii) WE if* $\lambda < \min\left\{\hat{\lambda}; \bar{c}/\bar{p}\right\}$.

The intuition behind the proposition is straightforward. A sufficiently high probability of formal contract enforcement (case 1i) forces opportunistic sellers to comply with the terms of their contract thus making it attractive for the buyers in the market to contract for quality $\bar{z}$. For a given sector size, all beneficial trades are realized in the entire economy. In contrast, a low probability of enforcement (case 1iii) makes the market contract inferior compared to the buyers' outside option and beneficial trades in the market are lost. In the intermediate equilibrium (case 1ii), the probability of enforcement is high enough while the proportion of breaching sellers is small enough, so that the combination of these two parameters makes the buyer's expected payoff from the market contract for $\bar{z}$ larger than her outside option and thus in-

duces those buyers who are in the market to contract even though enforcement is not sufficient to deter breach by opportunistic market sellers.

FIGURE 1: *Equilibria of the game*



(a) the benchmark case *(b) enforcement externality case*

Fig.1(a) illustrates Prop.1 and suggests that SE equilibrium would disappear if $\bar{p}$ is close to $\bar{c}$. In other words, it is more difficult to achieve compliance when the bargaining power of the buyers is high. If this is so, then even a relatively high probability of formal contract enforcement is not sufficient to deter breach of market contracts by opportunistic sellers. Intuitively, when the buyers can extract most of the trade surplus, opportunists do not have a large enough stake in the contract $(\bar{z}, \bar{p})$ and would prefer to breach it even when enforcement is highly likely.

It immediately follows from Prop.1 that liberalization of the economy (a rise in μ) leads to a higher welfare when enforcement of market contracts is strong (1i) and/or proportion of opportunists is low (1ii). Otherwise (1iii), an increase in the size of the market leads to an inferior outcome for this economy, since a large number of potentially beneficial trades are lost.

The exogenously fixed size of the market sector, μ, in the setting above appears to be a reasonable assumption if the two sectors are interpreted literally: after all, governments have the ultimate control over the size of the economy/sector that could be privatized. It could be envisaged, however, that the two sectors capture

different types of contracting possible in the economy: two different goods available for trade, $\{\underline{z},\ \bar{z}\}$, are associated with different enforcement regimes: a standard good, $\underline{z}$, with a known certain enforcement and a tailor-made (and, perhaps, more enjoyable/profitable) good, $\bar{z}$, with less certain enforcement (e.g. buying a house from a developer or building a house according to own design). Then it is reasonable to assume that the buyer and seller in a given trading pair would be able to choose between $\underline{z}$, $\bar{z}$, and 0 (non-contracting). Being offered all three possibilities, and taking into account the perfect enforcement associated with contract $(\underline{z}, \underline{p})$, no buyer would prefer to opt out of contracting if wide-spread breaching behaviour in $(\bar{z}, \bar{p})$ is expected. Instead, the buyer would then choose to contract for $\underline{z}$. Straightforwardly, the equilibrium choice of the contract is $(\bar{z}, \bar{p})$ if $\lambda \geq \bar{c}/\bar{p}$, as before: in this range of the institutional quality, every opportunistic seller would comply with $(\bar{z}, \bar{p})$, making it attractive for every buyer to sign this contract. If breach of $(\bar{z}, \bar{p})$ by opportunistic sellers is expected $(\lambda < \bar{c}/\bar{p})$, then the buyer would still choose this contract over $(\underline{z}, \underline{p})$, provided that it leads to a higher expected payoff: $(1-\gamma)\bar{z} - (1-\lambda\gamma)\bar{p} \geq \underline{z} - \underline{p}$, or $\lambda \geq [\underline{z} - \underline{p} + \bar{p} - (1-\gamma)\bar{z}]/\bar{p} \equiv \lambda^*$ (where $\lambda^* < 1$ if $\gamma < \gamma^* = [\bar{z} - \bar{p} - (\underline{z} - \underline{p})]/\underline{z}$). Alternatively, if $\lambda < \lambda^*$ and $\lambda < \bar{c}/\bar{p}$, then all opportunistic sellers breach the tailor-made contract but the definite compliance with the standard contract ensures that the latter is, nevertheless, signed. Thus, allowing the buyer-seller pair to choose between $\bar{z}$, $\underline{z}$ and 0, leads to qualitatively similar results to those stated above, except that the worst possible scenario, formerly called WE equilibrium, will now exhibit contracting for $(\underline{z}, \underline{p})$.[15]

3 Extensions

3.1 Enforcement externality

Suppose now that the resources devoted to enforcement are fixed, and therefore the likelihood of enforcement declines with the rise of the fraction of breached market contracts. Formally, let $\lambda(q) = \underline{\lambda}(1 - \delta(1-q))$, where $\underline{\lambda}$ is the exogenous level of enforcement available in the economy, q is the probability with which opportunistic

sellers comply with their market contract, and $\delta \in (0,1)$ is the enforcement externality parameter, introduced to capture fixed resources available for enforcement. For a given proportion of breaching opportunists, the larger the externality, δ, the lower is the probability of enforcement, $\lambda(q)$. By construction, enforcement is more likely the fewer breached contracts there are: $\lambda(0) = \underline{\lambda}(1-\delta) < \underline{\lambda} = \lambda(1)$.

As in section 2.2, the following cut-off value functions are derived for the exogenous level of enforcement:

$$\begin{aligned} &\text{if} \quad \underline{\lambda} \geq \frac{\bar{c}}{\bar{p}} \quad \text{then} \quad V_m^{\gamma}(\bar{z},\lambda)|_{q=1} \geq V_m^{\gamma}(\bar{z},\lambda)|_{q=0}, \\ &\text{if} \quad \underline{\lambda} < \lambda_1^{\delta} \quad \text{then} \quad V_m^{\gamma}(\bar{z},\lambda)|_{q=1} < V_m^{\gamma}(\bar{z},\lambda)|_{q=0}, \\ &\text{if} \quad \underline{\lambda} < \lambda_2^{\delta} \quad \text{then} \quad U_m(\bar{z},\lambda;q=0) < 0. \end{aligned}$$

$$\text{where} \quad \lambda_1^{\delta} \equiv \frac{\bar{c}}{\bar{p}(1-\delta)} \quad \text{and} \quad \lambda_2^{\delta} \equiv \frac{\bar{p}-(1-\gamma)\bar{z}}{\gamma\bar{p}(1-\delta)} \tag{5}$$

Comparison of these three cut-offs for $\underline{\lambda}$ suggests that, in contrast to the results in section 2.2, the equilibrium may no longer be unique.

Proposition 2 *Assume (A1). Then for any $\delta \in (0,1)$ there exists an equilibrium of the game.*

2.1 The equilibrium is unique and it is (i) SE if $\underline{\lambda} \geq \lambda_1^{\delta}$ and $\delta < 1 - \bar{c}/\bar{p}$, (ii) IE if $\lambda_2^{\delta} \leq \underline{\lambda} < \bar{c}/\bar{p}$, or (iii) WE if $\underline{\lambda} < \min\{\bar{c}/\bar{p}, \lambda_2^{\delta}\}$.

2.2 Otherwise, if $\bar{c}/\bar{p} \leq \underline{\lambda} < \lambda_1^{\delta}$ the equilibrium is not unique:

(i) if $\max\{\bar{c}/\bar{p}; \lambda_2^{\delta}\} \leq \underline{\lambda} < \min\{\lambda_1^{\delta}, 1\}$ then SE and IE coexist;

(ii) or if $\bar{c}/\bar{p} \leq \underline{\lambda} < \min\{\lambda_1^{\delta}, \lambda_2^{\delta}, 1\}$ then SE and WE coexist.

Fig.1(b) illustrates the proposition for the case when $\delta < 1 - \bar{c}/\bar{p}$ and therefore $\lambda_1^{\delta} < 1$. The intuition behind the existence of multiple equilibria is linked to the negative enforcement externality which makes equilibrium determination dependent upon each seller's belief about other sellers' behaviour. If a given seller believes that all other sellers are breaching their market contract, then the cost of his individual compliance is larger than the benefit from his individual breach which is detected

with a low probability: fixed resources devoted to enforcement are spread too thinly over the large number of breaches. Similarly, a seller's belief of other sellers' compliance makes individual breach too costly due to high detection probability. Fig.1(b) also highlights the significance of the enforcement externality: if it is sufficiently high ($\delta \geq 1 - \bar{c}/\bar{p}$), then $\lambda_1^\delta(\gamma)$ shifts out to the level of 1 or beyond, and multiple equilibria exist for any reasonably high value of the exogenous enforcement level, $\underline{\lambda} \geq \bar{c}/\bar{p}$. These predictions are in line with observed recent economic and institutional performance in CEE, as highlighted in the introduction.

The argument above yields the following policy implication for transition economies. Decentralization of economic activity will increase the size of the market sector, μ, which in turn will require more enforcement. Citizens' perception of effectiveness of enforcement may, however, vary over the sectors.[16] If everyone believes that the market transactions are unpoliced, then everybody in the market sector will find it optimal to breach their contract, further undermining the public perception of the effectiveness of formal contract enforcement. The larger the enforcement externality, the more detrimental could decentralization turn out to be because the multiplicity of equilibria is more likely for higher δ. The reformers-in-charge should aim to reduce this externality by means of, for example, publicizing new laws and improving transparency and accountability of courts.

3.2 Corruptible enforcers

Suppose that at date 5 *Nature* determines whether the market contract $(\bar{z}, \bar{p})$ in a given buyer-seller pair is 'enforceable' (with probability λ) or 'not enforceable' (with probability $1 - \lambda$). A contractual breach, when it occurs, is remedied by a self-interested enforcer who may well prefer not to take any enforcement action in exchange for a bribe from the seller. To maintain the focus on imperfect enforcement of contracts in the market, I continue to assume that there is no uncertainty with respect to enforceability of contracts in the state sector.[17] The level of corruption in the economy is assumed to be exogenous: a contract enforcer is corruptible with probability $0 < r \leq 1$ in which case he will accept a bribe $b > 0$ in exchange for

concealing the information regarding enforceability of the market contract.

Consider the bribe payment which the seller will be prepared to pay to the enforcer in exchange for enforcement inaction. If ex post enforceable contract is not enforced, then the seller's gain is $\bar{p} - b$. Otherwise, in the absence of a collusive agreement with the enforcer, the seller expects to obtain $\bar{p} - d = 0$. For bribery to occur, therefore, the bribe cannot exceed $\bar{p}$. Let $b = k\bar{p}$ with $0 < k < 1$ representing the bargaining power of the enforcer.

Before calculating the players' expected payoffs in the modified game, observe that an honest seller's expected gain from the market contract $(\bar{z}, \bar{p})$, as specified in (4), is not affected by considerations of corruption simply because corruption is only possible once a contract is breached and honest sellers are assumed to comply with their contracts without fail.[18] On signing contract $(\bar{z}, \bar{p})$ in the environment with corruptible enforcers, the expected payoff to a buyer and an opportunistic seller respectively becomes:

$$U_m(\bar{z}, \lambda, r) = \Big[1 - \gamma(1-q)\Big] \cdot \bar{z} - \Big[1 - \lambda\gamma(1-q)(1-r)\Big] \cdot \bar{p}, \tag{6}$$

$$V_m^{\gamma}(\bar{z}, \lambda, r) = \Big[1 - \lambda(1-q)[1 - r(1-k)]\Big] \cdot \bar{p} - q\bar{c}, \tag{7}$$

where q is chosen by the opportunistic seller in order to maximize (7), as before. The seller expects to incur the cost of providing the high quality if he complies with the contract (probability q). He will keep the buyer's up front payment, $\bar{p}$, unless he breaches the contract (probability $1 - q$). In the latter case, the breach is either remedied by an honest enforcer (with probability $\lambda(1 - r)$), and the seller loses the up front payment; or the breach is not remedied because the enforcer is bribed (with probability λr), the seller then loses k portion of the up front payment. When enforcers are corruptible, the buyer's gain, (6), from contract $(\bar{z}, \bar{p})$ is smaller by $\lambda\gamma(1-q) \cdot r\bar{p}$, as compared to the no corruption market contract payoff (2), namely it is smaller by the expected loss of the up front payment in all circumstances except when the breach is remedied by an honest enforcer. Define the following cut-offs:

$$\lambda_1^c = \frac{\bar{c}}{\bar{p}[1 - r(1-k)]}, \qquad \lambda_2^c = \frac{\bar{p} - (1-\gamma)\bar{z}}{\gamma\bar{p}(1-r)}, \tag{8}$$

$$r_1 = \frac{\bar{p} - \bar{c}}{\bar{p}(1-k)}, \qquad r_2 = \frac{\bar{z} - \bar{p} - \gamma(\bar{z} - \bar{c})}{\bar{z} - \bar{p} - \gamma(\bar{z} - \bar{c}) + k(\bar{p} - (1-\gamma)\bar{z})}. \tag{9}$$

Proposition 3 *Assume (A1),* $0 < k < 1$*, and let (8) and (9). Then there exists a unique equilibrium of the game with corruptible enforcers and it is WE, unless*

(i) $\lambda \geq \lambda_1^c$ *and* $r \leq \min\{r_1;\ 1\}$*, in which case it is SE; or*

(ii) $\lambda_2^c \leq \lambda < \lambda_1^c$*,* $\gamma < (\bar{z} - \bar{p})/(\bar{z} - \bar{c})$*, and* $r < r_2$*, in which case it is IE.*

The intuition behind Prop.3 is simple. For buyers to prefer contracting in the market to their outside option, enforceability of contract $(\bar{z}, \bar{p})$ must be sufficiently high, as in either 3i or 3ii. In addition, for an opportunistic seller to prefer compliance, and thus for SE equilibrium to exist cost of breach must be large enough (e.g. the number of corruptible enforcers is relatively small). As before, in IE equilibrium some contract enforceability per se is not sufficient to deter breach by all opportunistic sellers in the market; the buyers however prefer market contracting because the expected value of $(\bar{z}, \bar{p})$ contract is higher than their outside option. In the environment with corruptible enforcers, this would be the case when both the proportion of breaching sellers as well as the level of corruption among the enforcers is small enough. When neither of these two scenarios is possible, then it is less harmful for the buyers to opt out of market contracting altogether. Two observations immediately follow from Prop.3:

Remark 1 *SE equilibrium is more difficult to sustain when enforcers are corrupt.*

The proof is a straightforward comparison of the cut-off in the statement of Prop.3i with its analogue in the no-corruption environment of section 2.2, $\bar{c}/\bar{p}$. Clearly, the former exceeds the no-corruption cut-off for any $0 < k < 1$ and $0 < r \leq 1$. The remark implies that when contract enforcers are corruptible the institution of formal contract enforcement needs to be more effective (the probability that the contract is enforceable has to be higher) for opportunistic sellers to choose compliance in equilibrium.

Remark 2 *Assume (A1),* $r = 1$*, and* $\lambda \geq \lambda_1^c$*. If additionally* $k > \bar{c}/\bar{p}$*, then SE equilibrium prevails despite the high level of corruption in enforcement of market contracts.*

Intuitively, breach of market contracts will not occur when all enforcers are corrupt, have sufficiently strong bargaining power, and are large in number. To check this result, note that by Prop.3i, in the specified range of parameters the opportunistic sellers optimize by setting $q = 1$, thus making the buyers in the market to prefer contract $(\bar{z}, \bar{p})$ over their outside option. The key to understanding this result is the strong bargaining power enjoyed by the corrupt market contract enforcer when the existing legal provisions as such afford a high enough probability of enforcement: since all enforcers are corrupt, a breached contract is certain to attract an enforcer's demand for a bribe (due to $r = 1$), and thus the breaching seller stands to lose a large part of the gain from his breach (due to $k > \bar{c}/\bar{p}$). It is cheaper for the seller to comply with his market contract than to get involved in the bribing game. Hence, corruptibility of enforcers who can extract large bribes serves as a deterrent to contractual breach. This result highlights the relative importance of strengthening formal institutions in an economy with a high level of corruption (i.e, increasing the value of λ above the threshold given by Prop.3i). An improvement in formal institutions supporting markets is beneficial in curbing opportunistic behaviour of both private agents (sellers) as well as holders of public office (enforcers).

4 Importance of institutions in corrupt environments

This section further explores the implications of the result stated in Remark 2 which suggested the first-order importance of institutions in environments with corrupt public and private agents. The robustness of the result is checked by relaxing some of the assumptions of the basic model. Specifically, the extensions in this section introduce positive litigation costs, independent audits of enforcers, and breaching behaviour of buyers.

4.1 Costly litigation

Recall that Remark 2 relies on the assumption of costless litigation. It is intuitive to expect that with positive litigation costs borne by the party bringing the case for

enforcement, the buyer will be unwilling to take her breaching seller to court, since on the equilibrium path with the enforcer who is corrupt with certainty ($r = 1$), the buyer does not expect enforcement and therefore will be wasting her resources on litigation.[19] This section, however, demonstrates that the validity of Remark 2 can also be established under costly litigation, provided that either (i) the corrupt enforcer is subject to a cost of taking inappropriate enforcement action, or (ii) enforcement action taken is subject to an independent audit with a positive probability. Arguably, these assumptions—costly litigation with either an explicit auditing of enforcers or an implicit (perhaps, reputational) cost associated with non-enforcement of legitimate contracts—make the simple setting of sections 2.1 and 3.2 more realistic.

Formally, let $\xi > 0$ denote the cost associated with seeking enforcement of a breached contract and assume that this cost is borne by the buyer unless the enforcement action is obtained through litigation. In the latter case the seller is forced to reimburse the buyer's litigation cost (in addition to the pay back of the down payment, $\bar{p}$). For simplicity, let $r = 1$, so that it is known that all enforcers are corrupt and for a bribe may choose to take no-enforcement action when a given contract turns out to be enforceable ex post. Two scenarios are distinguished:[20] Scenario I "Costly litigation with reputational consequences" and Scenario II "Costly litigation with enforcement auditing". In Scenario I, suppose that both the seller and the buyer can offer a bribe to the corrupt enforcer: the buyer's bribe is denoted by B, the seller's bribe is b as before. Let $F > 0$ denote the marginal cost to the corrupt enforcer of taking an inappropriate enforcement action (i.e. not enforcing an ex post enforceable contract). F is intended to capture the idea that the corrupt enforcer marginally dislikes taking inappropriate enforcement actions: if the buyer and the seller offer the same bribe, the enforcer would rather accept the bribe from the buyer and hence take the appropriate enforcement action (albeit for a bribe), because then his corrupt behaviour is harder to detect. Thus, F captures the monetary equivalent of the implicit damage that the enforcer could suffer when his enforcement *inaction* becomes public knowledge. In Scenario II, $F = B = 0$ is assumed, while the appropriateness of the enforcer's action—i.e. whether it was possible, given the

realization of λ, to enforce a given contract—can be established by an independent auditor (e.g. a trading standards agency or a consumer watchdog): with some probability $\tau \in (0,1)$ the auditor can verify the realization of λ and order enforcement, if necessary.

The timing of the game stated in section 2.1 is now amended to include the litigation-bribery-enforcement subgame at stage 5: 5(a) Upon delivery of $z \neq \tilde{z}$, the buyer chooses whether to litigate. 5(b) If there is litigation, Nature moves to render the contract 'enforceable' (with probability λ) or 'not enforceable' $(1-\lambda)$. The status of the contract is observed by all three: the enforcer, the buyer and the seller. 5(c) If the contract is 'not enforceable', the game ends. Otherwise, if the contract is 'enforceable': *in Scenario I,* the buyer and the seller simultaneously choose the value of B and b, respectively; *in Scenario II,* the seller chooses the value, b. 5(d) The profit-maximizing corrupt enforcer accepts or rejects the bribe(s). Only one bribe offer can be accepted and leads the enforcer to choose 'enforce' or 'not enforce' in line with the corrupt agreement. If no bribe is accepted, 'enforce' is played. 5(e) *Scenario II only:* the independent monitor finds the evidence of inappropriate enforcement action and orders enforcement with probability τ.

In what follows, the existence of SE equilibrium in each case is analyzed separately and the findings of these analyses are summarized in Remark 3. Consider first Scenario I. The bribe that the seller is willing to pay to the enforcer in an attempt to get the no-enforcement action is $b \leq \bar{p} + \xi$, since if he wins the bribery game, the seller gets to keep $\bar{p}$ albeit at a cost of b, while choosing not to bribe the seller is certain to pay back the down payment made by the buyer, in addition to the payment of the buyer's litigation cost. Since the enforcer obtains $b - F$ from the seller's bribe, the buyer only needs to set $B = \bar{p} + \xi - F$ in order to ensure that the enforcer (weakly) prefers her offer.[21] Would the buyer be willing to litigate, knowing that a bribe of $\bar{p} + \xi - F$ would be necessary to get the contract enforced? If she chooses not to litigate, the buyer is certain to lose the down payment; while litigating and bribing, the buyer expects to lose $(1-\lambda)(\bar{p}+\xi) + \lambda B$, or substituting for B, she expects to lose $\bar{p} + \xi - \lambda F$. Consequently, the buyer will litigate and

bribe as long as $\lambda \geq \xi/F$ (provided that $\xi < F$). In turn, the seller who expects to lose the bribery game to the buyer, will prefer not to breach his contract in the first place if $(1-\lambda)\bar{p} + \lambda(-\xi) \leq \bar{p} - \bar{c}$, or, re-arranging, if $\lambda \geq \bar{c}/(\bar{p}+\xi)$. It can, therefore, be stated that the SE equilibrium will prevail, provided that $0 < \xi < F$ and $\lambda \geq \max\{\xi/F,\ \bar{c}/(\bar{p}+\xi)\}$, despite certain corruptibility of the enforcer ($r = 1$).

Turning to Scenario II, the seller's choice of the bribe is determined by the difference bribery is expected to make to his end-game payoff: if he does not bribe, the seller expects to end up with $-\xi$; while bribing the enforcer in the presence of an independent auditor, the seller expects to get $(1-\tau)\bar{p} - \tau\xi - b$. The seller would therefore be willing to set the bribe

$$b \leq b^* \equiv (1-\tau)(\bar{p}+\xi), \tag{10}$$

where b^* also represents the surplus resulting from the corrupt agreement between the enforcer and the seller. Suppose, as before, that $0 < k < 1$ is the enforcer's fraction of the surplus. Then the enforcer will accept the bribe kb^* in exchange for no enforcement action of the ex post enforceable contract for any $0 < k < 1$.

The buyer will be prepared to seek enforcement of her breached contract, if the expected loss from doing so, $(1-\tau\lambda)(\bar{p}+\xi)$, is smaller than the lost downpayment, $\bar{p}$. Following the contractual breach, the buyer will therefore prefer to litigate if

$$\lambda \geq \lambda_1^\tau \equiv \frac{\xi}{\tau(\bar{p}+\xi)} \quad [\text{where } \lambda_1^\tau < 1 \text{ for } \tau > \tau_1 \equiv \xi/(\bar{p}+\xi)] \tag{11}$$

Given the bribe to the enforcer determined above by (10) and expecting the buyer to litigate under (11), the seller compares his compliance payoff, $\bar{p} - \bar{c}$, with his expected payoff from breaching the contract, which is calculated as follows:

$$\begin{aligned} V_m^\gamma(\bar{z}, \lambda, k, \tau, \xi) &= (1-\lambda)\bar{p} + \lambda\Big\{\tau(\bar{p} - (\bar{p}+\xi) - kb^*) + (1-\tau)(\bar{p} - kb^*)\Big\} \\ &= \bar{p} - \lambda[\tau + k(1-\tau)](\bar{p}+\xi) \end{aligned}$$

That is, in the case of the breach with corruption, the seller expects to hold on to the down payment, $\bar{p}$, unless the contract turns out to be enforceable (probability λ); which triggers the payment of the bribe, $k(1-\tau)(\bar{p}+\xi)$, and, should the auditor

discover inappropriate non-enforcement (probability τ), the compensation payment of the buyer's loss, $\bar{p}+\xi$. It therefore follows that the seller would prefer compliance if:

$$\lambda \geq \lambda_2^{\tau} \equiv \frac{\bar{c}}{[\tau + k(1-\tau)](\bar{p}+\xi)} \quad [\text{where } \lambda_2^{\tau} < 1 \text{ if } \tau \geq \tau_2 \equiv \frac{\bar{c}}{\bar{p}+\xi} \text{ and } 0 < k < 1] \tag{12}$$

Comparison of (11) and (12) suggests that whenever $\lambda \geq \max\{\lambda_1^{\tau}, \lambda_2^{\tau}\}$ and $\tau > \max\{\tau_1, \tau_2\}$ for any $0 < k < 1$, the buyer will litigate, while the seller, expecting to pay the bribe kb^* with b^* given by (10), will prefer 'compliance' over 'breach'.

The analysis of each of the two scenarios above therefore suggests the following:

Remark 3 *Under costly litigation, the SE equilibrium prevails, provided that either there is a cost to an inappropriate enforcement action, or because the institutional quality (availability of independent random enforcement audits and adequacy of legal provisions) is sufficiently high to counter the corruptibility of enforcers.*

Note that this result holds for any $k \in (0, 1)$: In Scenario I, k does not enter the analysis because the competition between the buyer and the seller drives the bribe offers to the highest possible level. In Scenario II, sufficiently high institutional quality ensures that the seller's gain from the contractual breach is eroded by the expectation of contract enforcement through a random audit *even when* the act of bribery is relatively cheap for the seller (i.e. even if k is very small). A qualification of Remark 3 is that the 'good' equilibrium obtains if litigation costs are smaller than the implicit damage to the enforcer's image/reputation from enforcement inaction.

4.2 Two-sided contractual breach

The simple model of section 2.1 was set up to consider the possibility of breach by a single contractual party, the seller. It is, of course, more realistic to allow the possibility of breach on both sides of the contract. Formally, let $\theta\bar{p}$ with $0 < \theta < 1$ denote the down payment made by the buyer when contract $(\bar{z}, \bar{p})$ is agreed in stage 3 of the game in section 2.1. Suppose that all buyers are drawn from the

same population as sellers: a buyer is, therefore, honest with probability $1-\gamma$, in which case she pays up $(1-\theta)\bar{p}$ upon the delivery of $\bar{z}$; or she is opportunistic with probability γ in which case she can choose whether or not to pay up the outstanding amount upon the delivery. The buyer's type is her private information. The timing of the game in section 2.1 is now amended as follows: in stage 3 the prepayment is $\theta\bar{p}$; in stage 4, the buyer pays upon the delivery of $\bar{z}$ the outstanding amount, $(1-\theta)\bar{p}$, depending on her type. A breach is defined as the state of contract following non-delivery of $\bar{z}$ by the seller, or non-payment of $(1-\theta)\bar{p}$ by the buyer following the delivery of $\bar{z}$. Therefore, the two parties may go into litigation either in stage 4 (seller's non-delivery) or in stage 5 (buyer's default). Let $\xi > 0$ be the litigation cost, as before.

Suppose first that the enforcer is uncorrupt. Then, upon accepting the delivery of $\bar{z}$, the opportunistic buyer weighs the expected cost of default on the outstanding payment, $\lambda[(1-\theta)\bar{p}+\xi]$, against the cost of compliance, $(1-\theta)\bar{p}$. The buyer would prefer to comply if

$$\lambda \geq \lambda_1^\theta \equiv \frac{(1-\theta)\bar{p}}{(1-\theta)\bar{p}+\xi}. \tag{13}$$

If all buyers are expected to pay up upon the delivery of $\bar{z}$, what are the incentives of the opportunistic seller to breach his contract? The cost of compliance for the seller is $\bar{c}-(1-\theta)\bar{p}$, while non-delivery is now expected to cost $\lambda(\theta\bar{p}+\xi)$. The seller would therefore be willing to comply and deliver $\bar{z}$ if

$$\lambda \geq \lambda_2^\theta \equiv \frac{\bar{c}-(1-\theta)\bar{p}}{\xi+\theta\bar{p}} \tag{14}$$

It is therefore established that, in the absence of corruption in enforcement, the no-breach equilibrium SE exists if $\lambda \geq \max\{\lambda_1^\theta, \lambda_2^\theta\}$ for any $\xi > 0$ and $0 < \theta < 1$.

Assume now that the enforcer is corrupt ($r = 1$), but he marginally dislikes taking the wrong enforcement action, i.e. consider the Scenario I with $F > 0$ of section 4.1 above. For the existence of the no-breach equilibrium, it is necessary to check that opportunistic buyers, as well as opportunistic sellers, find it optimal to comply with their contract $(\bar{z}, \bar{p})$. Then analogously with the analysis in section 4.1, if a breaching opportunistic seller is prepared to bribe up to $\theta\bar{p}+\xi$ for no-

enforcement action, then his buyer would be prepared to set her bribe at $\theta\bar{p}+\xi-F$ in order to get the contract enforced even when the enforcer is corrupt. With this bribe, the buyer's expected payoff from litigation becomes $-(\theta\bar{p}+\xi)+\lambda F$, which is higher than her no-litigation payoff of $-\theta\bar{p}$, provided that $\lambda \geq \xi/F$ (and $\xi < F$). Then the opportunistic seller, who does not expect to win the bribery game, will find it optimal to comply and get $\bar{p}-\bar{c}$, rather than breach and obtain $\theta\bar{p}-\lambda(\theta\bar{p}+\xi)$, provided that $\lambda \geq \lambda_2^\theta$. Would the opportunistic buyer breach her contract in Scenario I? Defaulting on the outstanding payment upon the delivery of $\bar{z}$, she would be prepared to set the bribe at $B \leq (1-\theta)\bar{p}+\xi$ to avoid the enforcement. This, in turn, would allow the seller who delivered $\bar{z}$ to set his bribe at $b=(1-\theta)\bar{p}+\xi-F$, in order to get the corrupt enforcer to choose enforcement. It is easy to see that the non-cheating seller will find it optimal to bribe the enforcer to get enforcement of the initial contract (i.e. in order to extract the outstanding payment from the defaulting buyer) since $\bar{p}-\bar{c} \geq \theta\bar{p}-\bar{c}-\xi$ holds for any $\xi > 0$ and $0 < \theta < 1$. To check that the seller will be willing to litigate when his buyer defaults on the outstanding payment after the delivery of $\bar{z}$, notice that litigation with the bribe is expected to pay off $\theta\bar{p}-\bar{c}-\xi+\lambda[(1-\theta)\bar{p}+\xi-b]$, or $\theta\bar{p}-\bar{c}-\xi+\lambda F$, which is greater than the seller's no-litigation payoff of $\theta\bar{p}-\bar{c}$ when $\lambda \geq \xi/F$ and $\xi < F$. Given that her default on the outstanding payment is expected to be enforced by a corrupt enforcer (because the enforcer will have accepted the bribe from the seller), the buyer will find it optimal not to default in the first place if $\lambda \geq \lambda_1^\theta$: in this range of parameter λ the expected cost of default, $\lambda[(1-\theta)\bar{p}+\xi]$, is higher than the cost of compliance, $(1-\theta)\bar{p}$. Summarizing this analysis, when the enforcer is corrupt with certainty ($r=1$), the SE equilibrium exists for $0 < \xi < F$, $0 < \theta < 1$ and $\lambda \geq \{\xi/F, \lambda_1^\theta, \lambda_2^\theta\}$.

Remark 4 *Allowing for two-sided breach, the no-breach equilibrium SE exists even when all enforcers are corrupt with certainty, provided that the institutional quality is sufficiently high.*

This result therefore confirms the robustness of Remark 2 regarding the first-order importance of institutional quality in high-corruption environments. Notice, how-

ever, that the two-sided breach studied above is essentially one-sided sequential breach, which, arguably, is the kind of breach that is normally observed in real-life economic transactions. A simultaneous play, namely the seller's choice between the delivery of $\bar{z}$ and non-delivery, concurrent with the buyer's choice between the payment of $(1-\theta)\bar{p}$ and non-payment, could lead to three possible breach outcomes: (i) the delivery of $\bar{z}$ combined with non-payment of $(1-\theta)\bar{p}$, (ii) the payment of $(1-\theta)\bar{p}$ combined with non-delivery, and (iii) non-payment combined with non-delivery. The first two breach outcomes are clearly one-sided. The third breach outcome under the assumption of reliance damages would be interpreted by the court as either an annulment of the contract (when $\theta = 0$ which implies zero expected payoff for each breaching player in the simultaneous game), or as a breach by the seller (when $\theta > 0$, since the breach remedy in this case would force the seller to return the payment of $(1-\theta)\bar{z}$ made by the buyer). Thus, the simultaneous play would not change neither the analysis, nor the results, presented here.

5 Comparative statics and policy implications

This section considers how various factors, which have been suggested by the recent transition literature as contributing to an explanation of the observed variation in economic performance in CEE (Berglöf and Bolton 2002a, Hoff and Stiglitz 2004, Roland 2002), would impact on the equilibrium outcomes derived in section 3.1. The comparative statics exercise focuses on the following parameters: the size of the enforcement externality, δ, and the characteristics of the market sector contract $\bar{z},\ \bar{p},\ \bar{c}$.

Notice first that a lower value of parameter δ, other things remaining equal, will lead to a downward shift in Fig.1b of the threshold value λ_1^{δ}, thus enlarging the parameter space in which SE is unique. The enforcement externality is expected to be lower in countries where exposure to markets before communism and/or prior to transition towards capitalism have been significant. This is because it can be conjectured that its opposite, a historically very small (or non-existent) market

sector prior to reforms, meant that most trades outside the state sector were illegal. Following economic liberalization, the perception of illegitimacy of market exchange is likely to linger on,[22] which would translate into a larger value of δ, compared to a country that had some experience of market exchange prior to transition. Similarly, a larger value of δ is likely in a country that underwent corrupt privatization because in its aftermath economic agents learn not to trust (Hoff and Stiglitz 2004). It is also plausible to conjecture that the level of enforcement externality is likely to be low in a country with a historically low legacy of corruption (because the degree of mistrust in the society is then low), greater legitimacy of the state, politicians' accountability to the electorate, tradition of democracy before WWII, geographical proximity and likelihood of accession to the European Union, and overall respect for the rule of law.

Consider next changes in the characteristics of the market contract. A lower value of $\bar{p}$ implies an upward shift in the cut-off values of $\bar{c}/\bar{p}$ and λ_1^δ, while λ_2^δ is pushed to the right. As can be seen from Fig. 1b, this implies a shrinkage in the area where SE is unique and an increased region with multiple equilibria (because for a one unit change in $\bar{p}$ the magnitude of the corresponding change in $\bar{c}/\bar{p}$ is smaller than that in λ_1^δ). Arguably, a hyperinflation creates the perception of a relatively low $\bar{p}$ today compared to prices tomorrow. In contrast, a lower level of $\bar{c}$, other things remaining the same, shifts $\bar{c}/\bar{p}$ and λ_1^δ down, leaving λ_2^δ unaffected. That means the area where SE is unique expands, while the region with multiple equilibria shrinks more than the area where an inferior equilibrium (WE or IE) is unique. A lower cost of supplying the market good is likely to occur when the agents in the economy had previous experience of decentralized exchange (e.g. because the logistics of procuring or producing the market good is already in place). A lower value of $\bar{z}$ has no impact except on the cut-off λ_2^δ, which would shift it to the left thus increasing the area where WE is feasible. The value of the domestically produced market good may be lower in a natural resource abundant economy that is open to trade with economies that are relatively more abundant in capital (assuming the domestic consumers have a greater preference for relatively capital-intensive goods). Then, for the same level of the exogenously given probability of enforcement the

incidence of the worst equilibrium, WE, is higher when natural resource abundance is higher.

An altogether different matter that has implications well beyond transition economics and that is increasingly attracting scholars' attention is what shapes the structure of the new market-friendly institutions and why some governments fail to invest into the institutional infrastructure (such as law enforcement) despite its positive implications for economic development and growth. I briefly summarize the handful of very recent research that suggests some highly plausible and thought-provoking explanations, and explore one of the proposed arguments which lends itself naturally to replication in the present setting.

The past decade of transition in CEE highlighted the fact that a mass transfer of state assets into private ownership in quite a few notable examples (e.g. Russia) was not sufficient for generating sizeable grass-root demand for the rule of law and improvements in law enforcement. According to Hoff and Stiglitz (2004), the weakness of political demand for the rule of law may be accounted for by the prevailing uncertainty regarding the future enforcement regime. This uncertainty creates incentives for economic agents to behave opportunistically and strip assets under their ownership (rather than invest into increasing the value of those assets), which in turn makes it attractive to prolong the state of lawlessness (due to the ease of stripping assets under a weak enforcement of law). Factors that make stripping assets easier (e.g. open capital markets that allow ill-begotten gains to be safely whisked away into foreign bank accounts) contribute to the reduced constituency for the rule of law and ultimately to prolonging the no-rule-of-law state. Another explanation of weak support for the rule of law is suggested in Berglöf and Bolton (2002b) and derives from the extent of income inequality. Income inequality predicates different individual incentives with respect to the rule of law and income redistribution. The rich and the middle class (unlike the poor) are not interested in redistribution, but are able to make productive investments (also unlike the poor). Support for the rule of law in this model comes from the poor (interested in redistribution) and, possibly, the middle class who turn out to contain the pivotal voter. The middle class voters

will support the rule of law only if they have an incentive to make the investment: the return on the investment must be sufficiently large, while the deadweight loss of taxation sufficiently small. Thus, a large enough middle class that is willing to invest can be an effective constituency for the rule of law, because the investment today influences these individuals' incentive to support the rule of law tomorrow, whereas the expectation of no rule of law tomorrow diminishes their incentive to invest today. Inequality in wealth and power is also key to weak political demand for the rule of law in Sonin (2003). Here the powerful and wealthy agents have incentives to shape the institutions of enforcement in their favour by choosing a low level of public protection of property rights (and investing instead into private protection) because this strategy allows them to reap greater financial gain from corporate and social assets. Finally, the analysis by Roland and Verdier (2003) suggests that a 'big bang' reform strategy itself may be called to account for an insufficient investment into law enforcement institutions in transition. The big bang strategy in privatization is an overnight transfer of all state assets into private ownership. Its opposite, the gradualist strategy, which leaves a part of the economy in the state sector in the initial years of reforms, Roland and Verdier (2003) argue, eliminates multiple equilibria resulting in an outcome with better institutional support for markets. This is because in the presence of enforcement and tax externalities, the individual incentives for good behaviour that lead to investment and support for the rule of law are enhanced if maintaining direct state control over a part of the economy allows the government to finance law enforcement at a minimal level of taxation of private capital.

The Roland and Verdier (2003) argument finds a natural replication in the present setting. Let $t \in [0,1]$ denote the rate of tax levied on the market supplier and incorporate taxation externality in the analysis of section 3.1 by allowing $\lambda = \underline{\lambda}[(1-\mu) + \mu\{-\delta(1-q) + tq + \delta t(1-q)\}]$. This formulation of the enforcement externality now captures the idea that some resources which are channelled from the state sector are available for enforcement of market contracts and contribute to $1-\mu$ of $\underline{\lambda}$, the exogenous probability of enforcement. The influence of the market sector on the probability of contract enforcement, λ, is negative due to enforcement

externality imposed by breaching market suppliers, $-\delta(1-q)$, as before, but positive due to the resources available from taxing law-abiding market suppliers, tq. The last term in the square bracket signifies the positive effect of taxation on the enforcement externality: greater resources obtained through taxation reduce somewhat the negative effect of mass non-compliance. With this formulation, it is straightforward to check that multiple equilibria (e.g. SE and IE) exist when $t > \tilde{t} = [\mu(1+\delta)-1]/(\mu\delta)$. Alternatively, if $t \leq \tilde{t}$, then SE is unique. Thus it is shown that gradualism (defined here as a positive size of the state sector, which allows to generate finance for enforcement of market contracts) allows to eliminate the inferior equilibrium, a prediction which is in line with Roland and Verdier (2003).

6 Concluding comments

The results of this paper highlight the importance of institutions for the transition 'from plan to market': absent or inadequate institutions lead to a loss of beneficial decentralized contracts. Moreover, when formal contract enforcement exhibits a negative externality, then even for a relatively large amount of fixed resources devoted to enforcement bad equilibrium may prevail, because the equilibrium is determined by traders' perception of the effectiveness of enforcement. The larger the externality, the harder it is to achieve the good equilibrium in which all traders comply with their contractual obligations. The effect of a large externality on the welfare of the economy is indirect and feeds through the overall trading surplus. The larger the size of the market, the higher the proportion of beneficial trades which are lost in the weak enforcement equilibrium. This conclusion is likely to become even more grim if we accept that a large-scale change in the organization of economic activity (e.g. a change 'from plan to market') is likely to require new laws which are better suited to the new economic order.[23] The analysis also suggests that institutions to support market interaction have a first order effect on the success of liberalization in an environment of endemic corruption because an adequate legal framework helps to curb the high level of corruption in enforcement, as well as opportunism in contracting, by exposing the breacher to the enforcer's extortionary demands.

The significance of perceptions of institutional quality suggested by the analysis above merits further investigation, both theoretically and empirically. It is intuitive to expect that once institutional improvements are introduced a (perhaps, gradual) change in perceptions is likely. A theory of how perceptions are formed would therefore be useful for a better understanding of market interaction, as well as better policy design for a smooth transition.[24] The analysis also suggests a novel perspective for evaluating empirically the impact of perceptions of legal infrastructure on economic performance in CEE.[25] Cross-country variation in output fall and corruption can be explained by differences in perceived legal effectiveness, which is either measured directly (EBRD 1999), or approximated by the measures of enforcement externality such as legal legacy and previous exposure to private contracting and democracy.

Extending the theoretical analysis to repeated interaction could also help evaluate the relative significance of formal enforcement mechanisms versus informal ones. Survey-based evidence for CEE economies (McMillan and Woodruff (1999b, 1999a, 2000); Johnson, McMillan, and Woodruff (2002)) indicates that inadequacy of the legal infrastructure of laws, courts and police inherited from the years of directives and planning forces businesses to rely on reputation (e.g. gossip, social and/or business networks). Informal enforcement supported by information sharing cannot however substitute for formal enforcement entirely: while reputation helps to sustain established trading partnerships, effective courts encourage formation of new relationships by lowering switching costs and reducing risks.[26] These empirical findings therefore call for a detailed theoretical analysis of the relative merits of a particular enforcement mechanism in different types of economic environment.

Notes

[1]I would like to thank Spiros Bougheas, Panicos Demetriades, Jim Malcomson, Nicolas Melissas, Martin Sefton, Tom Weyman-Jones, Tim Worrall, and participants of the Royal Economic Society annual conference in Warwick, the Econometric Society European Meeting in Venice, the Midlands Game Theory and Applications Workshop in Nottingham for constructive discussions. The usual disclaimer applies.

[2]See Blanchard (1997) for a flavour of the issues in the early transition literature. A comprehensive summary of theoretical and applied research in transition economics is in Roland (2000), a recent survey of the literature which stresses the importance of institutions in transition is Roland (2002).

[3]An inadequacy (or lack) of new market-friendly institutions is thus another reason for the output fall observed in the initial years of post-communist transition. This explanation, based on informational and legal factors, complements those existing in the literature which emphasize strong technological complementarities as resulting from inefficient bargaining (Blanchard and Kremer 1997) or capital depreciation and delays due to search for more efficient partners (Roland and Verdier 1999).

[4]Ironically, one study found that 'statutory legal protections in Russia, which were much lower than the world average in 1992, were some of the world's highest by 1998' (World Bank 2002, p. 64).

[5]*Political centralization* to aid smooth economic *de*centralization, as suggested in Blanchard and Shleifer (2001), is then a natural channel, in view of the model presented here, for achieving better perception of legal effectiveness, since the central government is a provider of the basic institutional environment. Other channels to improve perceptions of institutional quality, actively promoted in World Bank (2002), include better transparency and accountability of courts, improved dissemination of information about recently enacted laws, training of law enforcers, and anti-corruption measures.

[6]This is the 'grabbing-hand' paradigm of the state involvement in the economy (Frye and Shleifer 1997).

[7]The present paper's modelling of corruption as bribery is standard in the literature: see for instance, Shleifer and Vishny (1993), Bardhan (1997), and Johnson, Kaufmann, McMillan, and Woodruff (2000). Acemoglu and Verdier (1998) analyze simultaneous determination of corruption, property rights enforcement, and investment in a model which leaves out considerations of economic decentralization.

[8]This analysis is also of relevance to the debate about public versus private ownership. The 'economy' in the model could be interpreted as a sector of the economy (e.g. health or education), with a part of the sector operating in the 'planned' (or directed) regime and the other part operating in a free market regime. The model proposed here could therefore be useful for understanding the role of law enforcement or regulation in combating fraud and opportunism in the provision of health care, education, and pensions.

[9]Section 4.2 below relaxes this assumption by allowing a partial pre-payment.

[10]In section 4.2 some buyers may behave opportunistically.

[11]$\lambda < 1$ can also represent the extent to which judiciary is unpredictable in resolving private disputes, or the information necessary for remedying the breach is partly verifiable.

[12]Positive litigation costs are introduced in section 4.1.

[13]It can be checked that the alternative assumption—unsuccessful buyers do not have the opportunity to contract in the other sector—would strengthen the qualitative results presented below.

[14]It can be shown that the same equilibrium allocation of buyers across the two sectors would result even if the market contract price were to adjust in response to an excess demand (Andrianova 2004).

[15]Note that this analysis suggests that a normalization of the standard quality, $\underline{z}$, to 0, with the consequent re-interpretation of market as 'contracting' sector and

state as 'non-contracting' sector, would imply that the contracting sector emerges when the institutional quality is sufficiently high (namely, $\lambda \geq \bar{c}/\bar{p}$). A similar result is found in Kali (1999) who examines the impact of business networks, providing informal contract enforcement, on the functioning of anonymous market exchange in a model with repeated matching and an unreliable legal system (in a sense that an innocent party may be convicted on a false accusation). Kali finds that such networks are not enforceable when court reliability is high, but become enforceable otherwise when they may emerge as a substitute for market exchange.

[16]Scholars of legal transition argue that a perception of inadequacy may arise if new laws to support markets are legal transplants from the West and run counter to local informal norms (Pistor 1996, Rubin 1997).

[17]Corruption of enforcers in the state sector is also possible and several scenarios can be envisaged to give rise to a negative spillover effect on the enforcement of market contracts. The results presented in this section will then be even stronger.

[18]Allowing for framing or blackmail by enforcers may well reverse this conclusion. See Polinsky and Shavell (2001) for an analysis of framing in law enforcement.

[19]Note, however, that recent experimental evidence (for a survey, see Fehr and Schmidt (2003)) suggests that economic agents are often strongly motivated by fairness and reciprocity and are therefore willing to reward or punish their opponents even at a considerable cost to themselves. It is therefore not implausible that, motivated by revenge, the victim of breach in the enforcement subgame of section 2.2 will litigate even when litigation is costly and the enforcer is corrupt. This is because litigation, albeit at a cost to the victim, allows the victim to punish the breacher who is then forced to surrender part of his gain from the breach in order to pay a bribe to the corrupt enforcer. For a flavour of the analysis and experimental evidence of payoff-reducing behaviour motivated by revenge see Abbink, Irlenbusch, and Renner (2000) and Falk, Fehr, and Fischbacher (2000).

[20]It is straightforward to simultaneously incorporate both scenarios into the same model, the separation here serves expositional clarity.

[21]This is the familiar Bertrand outcome of a game between two firms that produce a homogenous good but have different marginal costs; see Blume (2003) for the recent rigorous proof of the standard Bertrand result.

[22]An attitudes survey by Shiller, Boycko, and Korobov (1991) at the start of economic reforms in Russia found that, compared to their United States counterparts, a significantly higher proportion of the respondents from the Soviet Union expected businessmen to be dishonest.

[23]E.g. the chairman of the Higher Commercial Court of the Russian Federation complained that 'we are being asked to solve complex equations in multiple unknowns without so much as a multiplication table to guide us' (*Izvestiia*, July 3 1993, *cit op* Gustafson (1999, p. 151)).

[24]Such a theory calls for a repeated game framework and may encompass the Tirole (1996) mechanism of collective reputations.

[25]It can be noted, however, that the present theoretical analysis is in agreement with case-study evidence of transition in CEE: see, for example, Gray and Hendley (1997), and Greif and Kandel (1995).

[26]The results presented in section 3.1 also suggest that reliance on a reputational mechanism such as trust to support cooperation when formal enforcement mechanisms are ineffective may be problematic: if economic agents believe there is a high probability of opportunism, then lack of formal institutions combined with lack of trust will force the economy into a bad equilibrium.

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