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CONTRACT RENEGOTIATION IN MODELS OF ASYMMETRIC INFORMATION*

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1. Introduction

In practice, parties to a contract can usually rewrite the contract's terms if they so choose; courts do not typically interfere with a mutual agreement to rescind an old contract and replace it with a new one. A recent body of theoretical work has demonstrated, however, that the ability to renegotiate can considerably constrain parties' ex ante welfare. In this short paper, we review this and other implications of renegotiation when contracting parties have asymmetric information.[1]

In a world of complete contracts (subject to informational constraints) the possibility of future renegotiation can only hurt parties. It can never help, since if it did, the renegotiated outcome could simply be written into the original contract. Moreover, it may strictly reduce welfare because a contract that is ex ante optimal may no longer remain optimal at a later date (i.e., it may fail to be *sequentially* optimal). And if so, the contract will presumably be renegotiated, thereby losing its initial optimality.

Sequential optimality tends to fail because parties' objectives change over time. There are two reasons why they do. First, with time, parties may acquire information. Suppose that, as is common in models with asymmetric information, parties initially try to strike a contractual balance between risk-sharing and allocative efficiency. If at a later date they learn the realization of the random variable giving rise to the risk, they will then no longer be

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[1]See Aghion, Dewatripont and Rey (1989) for a discussion of renegotiation with symmetric information between parties. Besides the literature on contracts, several papers consider renegotiation in repeated games. In that setting, it is the (possibly) inefficient 'punishment' strategies, designed to enforce cooperative play, which are subject to renegotiation. [See Bernheim and Ray (1987), Farrell and Maskin (1987), and Pearce (1987).]

concerned about risk-sharing, and thus will want to 'undo' the original balance. In the next two sections, we examine renegotiation induced by new information.

Second, objectives may change because of the irreversibility of decisions. To take a classic example, suppose that a teacher wishes to induce her pupils to study. She 'contracts' with them to administer a test on Tuesday, and this prompts them to study on Monday. Once Tuesday arrives, however, it is in everyone's interest to 'recontract' and cancel the exam, since it has already accomplished its purpose. But if students anticipate this happening, it may be difficult to get them to study in the first place. We treat irreversibilities in section 4. We then conclude with a few remarks on the possibility of avoiding renegotiation.

2. Information revelation

To illustrate the interplay between information and renegotiation, let us consider a simple risk-sharing model. Suppose that at date 0, a risk-averse firm and a risk-neutral insurer sign an insurance contract. At dates 1 and 2, the firm chooses employment levels, which are publicly observable. Its profitability, however, is private information, represented by the random variable θ. We assume that θ takes on the values θ_1 and θ_2 ($\theta_1 < \theta_2$) with probabilities p_1 and p_2, respectively. The distribution of θ is common knowledge, and its realization (the 'state') is learned by the firm after date 0 but before date 1.

Because the insurer cannot observe profitability, any insurance benefits can be contingent only on employment levels.[2] If perfect competition among potential insurers drives expected profit to zero, then the optimal date 0 contract, *assuming parties can commit themselves not to renegotiate*, solves:

$$\max_{l_{it}, I_i} \sum_{i=1}^{2} p_i V\Big(\theta_i f(l_{i1}, l_{i2}) - \sum_{t=1}^{2} w_t l_{it} + I_i\Big) \qquad \text{subject to} \tag{1}$$

$$\sum_{i=1}^{2} p_i I_i \leqq 0, \qquad \text{and} \tag{2}$$

$$\theta_i f(l_{i1}, l_{i2}) - \sum_{t=1}^{2} w_t l_{it} + I_i \geqq \theta_i f(l_{j1}, l_{j2}) - \sum_{i=1}^{2} w_t l_{jt} + I_j, \qquad \text{for all} \quad i, j \in \{1, 2\}, \tag{3}$$

[2]This is not quite accurate because both benefits and employment levels might instead depend on the firm's announcements about the state so long as these announcements were made incentive-compatible. But as long as this dependence is not random, the two formulations are equivalent.

where l_{it} is employment in state θ_i and date t, w_t is the competitive wage at date t, f is the production function (where f is twice differentiable, concave, and increasing in its arguments), I_i is the firm's insurance benefit corresponding to employment profile (l_{i1}, l_{i2}), and V is the firm's utility function (with $V' > 0 > V''$, where primes denote derivatives). (For simplicity, we have assumed no discounting.) Condition (2) is the insurer's zero-profit constraint, and condition (3) comprises the firm's incentive constraints. As is standard [see, for example, Hart (1983)], the solution to program (1)–(3) exhibits ex post efficiency in state θ_2 (i.e., (l_{21}, l_{22}) satisfies $\theta_2 f_t(l_{21}, l_{22}) = w_t$ for $t = 1, 2$, where f_t denotes the partial derivative of f with respect to argument t), and ex post underemployment in state θ_1 $(\theta_1 f_t((l_{11}, l_{12}) > w_t$ for $t = 1, 2)$. The underemployment is desirable ex ante to improve risk sharing.

This solution, however, is not renegotiation-proof. Notice that because $l_{11} \neq l_{21}$, the firm's first-period employment choice reveals the value of θ to the insurer. Hence, the parties can renegotiate under symmetric information at the beginning of period 2. If $\theta = \theta_1$, moreover, they can transact a Pareto improvement, since, as we have noted, l_{12} is not ex post efficient. Although such renegotiation improves welfare ex post, it violates the incentive constraints (3) and thus is harmful in an ex ante sense. Thus the possibility of renegotiation limits the ability of the contracting parties to use underemployment as a way of enhancing risk sharing.

To be more explicit about these limitations, assume, for example, that renegotiation at date 2 consists of a single take-it-or-leave-it contract proposal by the insurer. If the firm rejects this proposal, the initial contract remains in effect; if it accepts, the new contract takes force. Let us, for the moment, consider only contracts in which each state corresponds to a single employment level [as in the program (1)–(3)]. Then to ensure that the contract is proof against the renegotiation process described above, we must impose either the constraint

$$l_{11} = l_{12}, \qquad \text{or} \tag{4a}$$

$$\theta_1 f_2(l_{11}, l_{12}) = w_2, \tag{4b}$$

in addition to constraints (2) and (3). If (4a) pertains – i.e., the contract is 'pooling' at date 1 – then the insurer's beliefs at date 2 about the state are just the prior probabilities. Provided that the contract solves (1) subject to (2), (3), and (4a), no Pareto improvement is possible at date 2. If (4a) fails to hold, however, then the firm's first period employment choice reveals the value of θ to the insurer. In this case, as we have seen, the insurer can propose a Pareto-improving contract if $\theta = \theta_1$, unless l_{12} is set ex post efficiently, i.e., unless (4b) holds.

Conditions (4a) and (4b) thus represent a tradeoff between first and second period employment levels as screening devices. Such a tradeoff can be considered more generally, by allowing for contracts in which the firm chooses (by randomizing) among several different employment levels in a given state. (This sort of randomization is distinct from that mentioned in footnote 2). By resorting to such contracts, the parties can maintain some underemployment in state θ_1 at date 2 without full pooling at date 1; because partial pooling limits the insurer's information, it also constrains the range of renegotiation possibilities.

Specifically, suppose that the firm sets (l_{11}, l_{12}) in state θ_1, and randomizes in state θ_2 between (l_{21}, l'_{22}) and (l_{11}, l_{22}), with probabilities $1-\beta$ and β respectively. Suppose that l_{11} is the realization of first-period employment. If l_{12} is below the ex post efficient level for θ_1, the insurer may be inclined to make a renegotiation proposal in period 2. However, it faces a dilemma: how to raise l_{12} without simultaneously inducing the state θ_2 firm to choose l_{12}. Because a rise in l_{12} is especially profitable in state θ_2, the answer is that the insurer must concede some rent (through a rise in its insurance payment) to induce the θ_2 firm to select l'_{22}. For the contract to be renegotiation proof, therefore β has to be high enough so that the rent conceded counterbalances the efficiency gain of raising l_{12}.[3]

There have been several studies analyzing the effect of renegotiation in models similar to that above. Dewatripont (1989) considers a labor market

[3]Let I'_2 be the insurance payment corresponding to (l_{11}, l'_{22}). Then (1) becomes

$$\max p_1 V\left(\theta_1 f(l_{11}, l_{12}) - \sum_{t=1}^{2} w_t l_{1t} + I_1\right) + p_2 \beta V(\theta_2 f(l_{11}, l'_{22}) - (w_1 l_{11} + w_2 l'_{22}) + I'_2)$$
$$+ p_2(1-\beta) V\left(\theta_2 f(l_{21}, l_{22}) - \sum_{t=1}^{2} w_t l_{2t} + I_2\right), \tag{1'}$$

and the constraints (2), (3), and (4a) or (4b) are replaced by:

$$p_1 I_1 + p_2(\beta I'_2 + (1-\beta) I_2) \leqq 0, \tag{2'}$$
$$\theta_2 f(l_{21}, l_{22}) - (w_1 l_{21} + w_2 l_{22}) + I_2 = \theta_2 f(l_{11}, l'_{22}) - (w_1 l_{11} + w_2 l'_{22}) + I'_2, \tag{3'}$$
$$\theta_2 f(l_{11}, l'_{22}) - w_2 l'_{22} + I'_2 \geqq \theta_2 f(l_{11}, l_{12}) - w_2 l_{12} + I_1, \quad \text{and} \tag{3''}$$
$$p_2 \beta(\theta_2 - \theta_1) f_2(l_{11}, l_{12}) \geqq p_1(\theta_1 f_2(l_{11}, l_{12}) - w_2). \tag{4'}$$

Condition (2') is the insurer's zero profit condition, whereas (3') embodies the requirement that the firm in state θ_2 should be indifferent between (l_{11}, l'_{22}) and (l_{21}, l_{22}) (so that it is willing to randomize between the two). Condition (3'') is the binding incentive constraint (the other constraints, which guarantee that the firm in state θ_1 prefers (l_{11}, l_{12}) to (l_{11}, l'_{22}) or (l_{21}, l_{22}), are satisfied automatically). Finally, (4') constitutes the requirement that the contract be renegotiation-proof: If, after observing the choice l_{11}, the insurer proposes a new contract in which l_{12} is raised to $l_{12} + \Delta l_{12}$ (in order to move toward ex post efficiency), it can reduce I_1 by $(\theta_1 f_2(l_{11}, l_{12}) - w_2)\Delta l_{12}$ (if Δl_{12} is small) while still improving the firm's welfare in state θ_1. But raising l_{12} and lowering I_1 increases the right-hand side of (3'') by $(\theta_2 - \theta_1) f_2(l_{11}, l_{12})\Delta l_{12}$, and so, to keep the constraint satisfied, I'_2 must be raised by the same amount. The overall effect on the insurer's expected payoff is thus $p_2 \beta(\theta_2 - \theta_1) f_2(l_{11}, l_{12})\Delta l_{12} - p_1(\theta_1 f_2(l_{11}, l_{12}) - w)\Delta l_{12}$, which to prevent renegotiation must be nonpositive – hence, condition (4'). And although (4') is a local condition, it implies 'global' renegotiation-proofness because its right-hand side falls more quickly than the left-hand side when l_{12} rises.

setting. Hart and Tirole (1988) examine a bargaining framework and compare the sale and rental of a durable good. And Laffont and Tirole (1988) focus on military procurement, comparing short-term contracts (giving rise to a 'ratchet' effect) and long-term contracts without commitment not to renegotiate.[4]

One lesson of this literature is that the possibility of renegotiation tends to reduce the speed of information revelation in optimal contracts. In the solution to (1)–(3), all private information is revealed at date 1. As we have seen, however, this is inconsistent with renegotiation-proofness, since the solution entails underemployment in state θ_1. Indeed, as long as the optimal renegotiation-proof contract incorporates at least partial pooling at date 1 ($\beta>0$), there is a positive probability that the state is not revealed to the insurer until date 2. Provided that the returns to scale to date 2 employment are not too strongly decreasing (i.e., that $|f_{22}/f_2|$ is not too large), moreover, β *is* positive at the optimum.[5]

The hypothesis that $|f_{22}/f_2|$ is small is equivalent to the assumption that second-period employment is high (relative to first period employment). Thus we conclude that if second period employment is high enough and renegotiation is possible, it is worthwhile to engender some pooling in the first period so that underemployment can be used to improve risk-sharing in the second period (note that if $|f_{22}/f_2|$ is small the efficiency loss from the underemployment will be small in comparison to the gain of being able to use second-

[4]Dewatripont considers an n-period model and restricts attention to deterministic contracts. Hart and Tirole and Laffont and Tirole allow for randomization and work, respectively, with infinite-horizon and two-period frameworks.

[5]To see this, note that if β is zero, we can raise it slightly by $\Delta\beta$ and decrease l_{12} by

$$\Delta\beta\frac{\mathrm{d}l_{12}}{\mathrm{d}\beta}=\Delta\beta p_2(\theta_2-\theta_1)f_2(l_{11},l_{12})/p_1\theta_1 f_{22}(l_{11},l_{12}), \tag{5}$$

while maintaining (4'). If we then adjust I_1, I_2, and I'_2 to keep (2'), (3'), and (3'') satisfied, we obtain

$$\frac{\mathrm{d}I_1}{\mathrm{d}\beta}=p_2(I_2-I'_2)-p_2\theta_2 f_2\frac{\mathrm{d}l_{12}}{\mathrm{d}\beta}, \tag{6}$$

$$\frac{\mathrm{d}I'_2}{\mathrm{d}\beta}=\theta_2 f_2(l_{11},l_{12})\frac{\mathrm{d}l_{12}}{\mathrm{d}\beta}+\frac{\mathrm{d}I_1}{\mathrm{d}\beta}, \quad \text{and} \tag{7}$$

$$\frac{\mathrm{d}I_2}{\mathrm{d}\beta}=\frac{\mathrm{d}I'_2}{\mathrm{d}\beta}. \tag{8}$$

From (6)–(8), the effect on the firm's expected welfare from these changes is

$$-p_1p_2\theta_2 f_2(l_{11},l_{12})\frac{\mathrm{d}l_{12}}{\mathrm{d}\beta}[V'(1)-V'(2)]\Delta\beta$$
$$+[p_1p_2V'(1)+p_2^2V'(2)][I_2-I'_2]\Delta\beta+p_2[V(2)-V(2')]\Delta\beta, \tag{9}$$

where $V(1)$, $V(2')$, and $V(2)$ are the Vs from the first, second, and third terms, respectively, of (1'). Because V is strictly concave $V'(1)>V'(2)$ and so the bracketed expression in the first term of (9) is positive. But from (5), $|\mathrm{d}l_{12}/\mathrm{d}\beta|$ is arbitrarily large for $|f_{22}/f_2|$ sufficiently small, and so (9) is positive, as claimed.

period underemployment to improve risk-sharing). This is related to the finding of Laffont and Tirole (1988) that if, in a two-period production process, the second period is long enough relative to the first, then first-period pooling will be desirable if renegotiation in the second period is possible.

Another principle from the literature is that the ability to renegotiate creates a value to rigidity. Consider the model above when f is symmetric in its arguments and $w_1 = w_2$. Then the solution to (1)–(3) entails $l_{i1} = l_{i2}$ for $i = 1, 2$. Furthermore, if the first period employment level cannot be adjusted in the second period, this solution is attainable, since renegotiation becomes impossible. Of course, if the model is asymmetric across periods, such rigidity may be harmful. Similarly, it may be costly if, unlike our model, not all uncertainty is resolved at the beginning. With later resolution of uncertainty, moreover, the constraint of renegotiation-proofness itself (in the absence of rigidity) becomes less severe (because the informational content of first-period employment is smaller).

We assumed above that renegotiation consists of a proposal by the *uninformed* party (the insurer), which the informed party can accept or reject. The same is true of most of the analysis in the papers we have mentioned (in models with more than two periods, the uninformed party makes proposals at the beginning of each period). This simplifies matters, since, as a result, renegotiation proposals themselves have no signaling content. It remains an open question, however, how sensitive results are to the assumption. Maskin and Tirole (1987) provide an answer to this question in the case of a two-period model where only a single proposal to renegotiate is possible. Namely, the optimal renegotiation-proof contract when the uninformed party makes the proposal is 'strongly' renegotiation-proof if the informed party is the proposer, i.e., it is the unique equilibrium outcome of the renegotiation game starting from that contract. This correspondence between informed and uninformed proposals, however, does not extend to three or more periods.[6] Indeed, in such models strongly renegotiation-proof contracts need not exist.

3. The extent of observability

So far we have taken the set of publicly observable variables as given. This set may, however, be to some degree under the control of the two parties themselves. For example, if, for some t, we interpret l_{it} as the employment of intangible or human capital,[7] it may be necessary to set up a monitoring system in advance if the insurer is to observe the level that the firm has set. Under the constraint of renegotiation, moreover, parties may find it desirable

[6]As noted, for example, by Hart and Tirole (1988).

[7]For the purpose of this section, l_{i1} and l_{i2} should be thought of as different sorts of inputs. Hence, it may be possible to monitor one without monitoring the other.

to ensure that certain variables are *not* observable, as shown in Dewatripont and Maskin (1989a).

Consider the model of the previous section. The potential advantage of making an employment decision unobservable to the insurer is that the firm can then set employment at different levels in different states without conveying information to the insurer. The drawback is that the firm will choose the unobserved variable ex post efficiently (since such a choice maximizes its profit), which may interfere with risk-sharing.

Clearly, there is no gain if second-period employment is unobservable: the firm sets l_{12} so that $\theta_1 f_2(l_{11}, l_{12}) = w_2$; thus constraint (4b) obtains, and no other constraint is correspondingly relaxed. Suppose, however, that *first*-period employment is unobservable. The contract can then violate (4a) without satisfying (4b). To see that this might be desirable, assume that the firm is extremely risk-averse (so that only its payoff in state θ_1 matters ex ante). Also assume that w_1 is big relative to θ_2, that θ_2 is big relative to θ_1, and that θ_1 is big relative to w_2. Finally, suppose that $f_2(0,0) > 0$ and that $\lim_{l_2 \to \infty} f_1(0, l_2) = \infty$. Then, l_{11} and l_{12} in the solution to program (1)–(3) will be nearly zero.[8] Now, under our assumptions, second-period employment in state θ_1 is low in the optimal contract when first-period employment is unobservable. Moreover, first-period employment is nearly zero in this contract, as well.[9] Thus, the optimal contract with unobservable first-period employment approximates the solution with commitment not to renegotiate, i.e., the solution to (1)–(3). That is *not* the case, however, for the optimal renegotiation-proof contract with observable first-period employment: the constraint (4a) is inconsistent with the solution to (1)–(3) since, in the latter, l_{21} is positive (since θ_2 is big relative to w_1, l_{22} is big, and so $\lim_{l_2 \to \infty} f_1(0, l_2) = \infty$ implies that $l_{21} > 0$) under our assumptions and, as already noted $l_{11} \approx 0$, (similarly, if $\beta > 0$ in the solution to (1′)–(4′), the solution is inconsistent with that of (1)–(3)); moreover, (4b) is also inconsistent with (1)–(3) since second-period employment in state 1 is positive in the renegotiation-proof contract (since $f_2(0,0) > 0$ and θ_1 is big relative to w_2), contradicting our finding that $l_{12} \approx 0$ in the solution (1)–(3). Hence, given our hypotheses, it is desirable that first-period employment be unobservable.

[8]One can verify that, given extreme risk-aversion, the program (1)–(3) reduces to $\max[\theta_1 f(l_{11}, l_{12}) - \sum w_t l_{1t} + p_2(\theta_2 f(l_{21}, l_{22}) - \sum w_t l_{2t} - \theta_2 f(l_{11}, l_{12}) + \sum w_t l_{1t})]$. Note that, for θ_2 big relative to θ_1, $l_{11} = l_{12} = 0$ in the solution.

[9]With extreme risk-aversion, the optimal contract when first-period employment is unobservable solves $\max[\theta_1 f(l_{11}, l_{12}) - \sum w_t l_{1t} + p_2(\theta_2 f(l_{21}, l_{22}) - \sum w_t l_{22} - \theta_2 f(l'_{11}, l_{12}) + \sum w_t l_{12}]$ subject to the ex post efficiency constraints $\theta_1 f_1(l_{11}, l_{12}) = w_1$ and $\theta_2 f_1(l'_{11}, l_{12}) = w_2$, where l'_{11} is the first-period employment level that the state θ_2-firm sets if it 'pretends' that $\theta = \theta_1$ by settting second-period employment at the level l_{12}. More explicitly, the solution to this program is the optimal contract when not only is the insurer unable to observe first-period employment, but cannot even discern when that variable is set. At the optimum, for θ_2 big relative to $\theta_1, l_{12} = 0$ and, for w_1 big relative to θ_2, $l'_{11} = l_{11} = 0$. Hence, the solution to the program is the same as that in footnote 8.

In Dewatripont and Maskin (1989a), we extend this conclusion to utility functions that need not exhibit extreme risk aversion. We also provide an analogous set of conditions for the desirability of restricting observability when the assumptions about θ and w are replaced by the hypotheses that θ_2 is not too much greater than θ_1 and that second-period profit is weighted sufficiently more heavily than first-period profit.

The literature on organization has sometimes posited that contracts are not contingent on all possible observables [see Williamson (1975) or Grossman and Hart (1986)]. This contractual simplicity is usually attributed to exogenous factors: lack of verifiability, the cost of enumerating contingencies, or bounded rationality. The analysis above shows, however, that the possibility of renegotiation may *endogenously* simplify contracts. Parties may deliberately choose not to set up certain monitoring or accounting systems in order to limit the extent of observability.

4. Irreversibilities

In sections 2 and 3, renegotiation is precipitated by information revealed to the insurer during a contract's execution. Alternatively, renegotiation may be induced by the irreversibility of certain decisions.

Fudenberg and Tirole (1988) and Ma (1987) analyze renegotiation in a model of moral hazard. In this model a risk-averse agent exerts effort that results in stochastic output. Effort is assumed unobservable to the risk-neutral principal, and so her payment to the agent is contingent on output. Since the agent is risk-averse, the optimal contract insures him against fluctuations in output to some extent. Insurance, however, cannot be perfect; otherwise, the agent would be unwilling to exert more than minimal effort. Now, suppose that the contract between the principal and agent can be renegotiated after effort is incurred but before output is realized. If given the contract, the agent chooses an effort level deterministically, then a Pareto-improvement is possible at the renegotiation stage: the new contract gives the agent the mean payment associated with the old contract (at the chosen effort level) minus a risk premium. But since the agent will anticipate this renegotiation, his effort, as noted above, must be minimal. If minimal effort is not desirable, therefore, the optimal renegotiation-proof contract must induce the agent to *randomize* his choice of effort. Such randomization creates asymmetric information between the principal and agent, thereby making renegotiation more difficult (and, in particular, preventing full insurance).

In another example of the interplay between irreversibilities and renegotiation, Dewatripont (1988) studies a model where, in order to deter potential entrants, a firm and its workers sign a contract providing for high severance pay. Would-be entrants realize that the prospect of the severance pay will induce the incumbent to maintain employment and hence output after entry has occurred; hence, they may be deterred from entering. If entry is irreversible, however, then once it occurs the firm and workers have a mutual interest to renegotiate away the high severance payments and set output at its efficient post-entry level. Only asymmetric information between the parties can prevent immediate restoration of ex post efficiency; as in section 2, the asymmetry may slow the rate of information transmission. Hence, with asymmetric information, severance pay may act as an effective deterrent to entry even in the face of potential renegotiation.

Dewatripont and Maskin (1989b), where we consider the role of institutional design as a commitment device against renegotiation, provides a third example of irreversibility – induced renegotiation. We focus on a model of credit under adverse selection. A lender faces two types of entrepreneurs, both of which need one dollar of credit per period. 'Good' entrepreneurs' projects generate a gross return of more than a dollar after one period. 'Bad' entrepreneurs' projects generate nothing after one period, but between one and two dollars after two periods.

Although a bad project is ex ante unprofitable, it nonetheless ought to be refinanced after the first-period investment has already been sunk. Because a lender cannot initially distinguish between good and bad projects, it would like to commit itself not to refinance in order to discourage bad entrepreneurs from undertaking their projects. Such a commitment is impossible if the lender has funds available for a second-period loan; renegotiation ensures that refinancing will occur. Suppose, however, that the lender does not have sufficient capital to refinance. Then, of course, a bad entrepreneur might turn to a second lender. We argue, however, that this new creditor is likely to be at an informational disadvantage relative to the first lender, who has been learning about the project from the outset. The first lender's superior information may enable it to extract rent from the new creditor, which reduces the profitability and therefore the likelihood of refinancing.[10]

Thus, spreading the availability of credit over several potential lenders – decentralizing credit – may serve as an institutional commitment against refinancing. Such a model may help explain why centralized economies seem more prone to exhibit what Kornai (1979) has called a 'soft budget constraint': the perpetuation of unprofitable enterprises. More precisely, it suggests why the decentralization of credit gives rise to a 'hard budget constraint' by making refinancing comparatively difficult.

We should point out that our model does not favor decentralization completely unambiguously. Although a decentralized econony may have the virtue of deterring bad projects, it suffers, in comparison with centralization, from a tendency to discourage long-term but profitable investments. That is,

[10]Depending on the nature of the bargaining, the entrepreneur may be the one who extracts some or all of this rent. The point is that the entrepreneur and first lender are at an advantage relative to the second lender.

the model predicts an excessive preoccupation with short-term returns in decentralized settings.

5. Avoiding renegotiation

We have been implicitly assuming that a mutually advantageous opportunity to renegotiate will always be exploited. But because such exploitation is harmful ex ante, we might expect parties to look for ways of preventing it.

We have already suggested that deliberately introducing rigidities, observability, or redesigning institutional structure might help. Another route is to enlist the aid of third parties. For example, the two original parties might agree to forfeit a large sum of money to a designated outsider should they ever renegotiate. The problem with such a scheme, however, is that unless the outsider is 'incorruptible,' he can be bribed into permitting renegotiation, and, furthermore, it will be optimal to buy him off if the original contract prescribes a course of action that is inefficient.

Thus, the desirability of limiting renegotiation suggests that there may be value to cultivating a reputation for incorruptibility and that in settings where this value is particularly high we might expect to see a 'market' for third parties known for their integrity.

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