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Restructuring Know-how and Collateral

By Dorothea Schäfer, Berlin*

I. Introduction

A close relationship often involves lenders in the restructuring of their distressed clients (*Gilson* 1990 and *Elsas* and *Krahnen* 2000). Many lenders become actively involved in management affairs and take up much of the distressed firm's equity. Since such restructuring activities need special expertise, banks must have previously accumulated restructuring know-how. In this paper, we analyze the circumstances under which banks have an incentive to invest in restructuring know-how. In addition, we explicitly explore the relationship between outside collateral and restructuring know-how.

The investment in restructuring know-how may be thought of as a firm-specific, monitoring process. The process starts immediately after the firm has chosen a debt contract which includes restructuring service. During the process, the loan officer, together with some members of the restructuring department, may collect any relevant information and prepare it for later usage. Such collection of private information cannot be done without developing a relationship with the firm and, from time to time, having consultations with the entrepreneur. Thus the bank's ability to restructure a firm, and to maintain it after taking the firm over as a going concern, is an important feature of relationship lending (*Boot* 2000).

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The paper builds on the bargaining-based theory of a debt contract developed by *Hart* and *Moore* (1994), *Berglöf* and *von Thadden* (1994), and *Bester* (1994). According to this theory, the financier's capability to manage the firm influences future negotiations between the entrepreneur and the investor. Since potential renegotiations are anticipated, they also affect the decisions at the time of contracting. Financial contracts are determined by the trade off between the desire to deter strategic default and the intention to limit inefficient liquidation in liquidity default.

We study the problem in the framework of Bester (1994). An entrepreneur needs to raise funds for a profitable risky investment project. The creditor cannot directly observe the project's returns. The optimal debt contract contains a bankruptcy clause that provides the entrepreneur with a strong incentive to fulfill his liabilities. When bankruptcy is declared the creditor can take hold of at least some of the entrepreneur's assets. But the creditor is the less efficient owner. Therefore, in low return states, he finds it preferable to forgive the debt partially and leave the project's control to the debtor. Realizing that default can be followed by forgiveness the entrepreneur has an incentive to cheat. He may pretend not being able to pay his liabilities in full. Consequently, bankruptcy can also happen in virtually good states and the expected costs arising from inefficient transfer of ownership increase. Since the bank's inefficient management of the firm's assets is considered as an inevitable bottleneck, the optimality of limited liability is ruled out. The motive of cheating can only be weakened by posting outside collateral.

We depart from this approach by emphasizing that the inefficiency of the bank's management and the consequent lack of precommitment not to forgive any part of the outstanding debt is by no means a natural part of the loan arrangement. It is rather a result of the creditor's choice at the time of contracting. Two options are available at this time, the abstention from or the costly acquisition of restructuring know-how. Since the know-how enables banks to take over efficiently, it establishes an inherent precommitment not to renegotiate, and discourages strategic default. In our analysis the trade off between the desire to preserve the value of the inside assets and the wish to avoid the restructuring investment determines the design of contracts.

Restructuring know-how is always profitable if the venture demands a high initial investment by the bank. In the case of modest or low initial investment, however, restructuring know-how is only accumulated if the bank determines the contract. Given this result, we would expect two types of bank to coexist: First, a bank type which is not concerned about

restructuring and second, a bank type which is able to take over without a noticeable loss in the firm's assets value. This type immediately initiates a complete transfer of control in the case of default. In fact, *Edwards* and *Fisher* (1993) find such a differentiation between banks which have a restructuring department and banks which do not. Divergent assumptions in the literature concerning the cost of a transfer of control may thus be explained by referring to these different types of bank.

The restructuring type of bank should be observed more often in a market segment where small and medium-sized firms apply for loans and banks determine the contracts. This result is consistent with *Petersen* and *Rajan* (1994). Their empirical study reveals that banks are the more inclined to engage in relationship lending the higher their market power is. It is also supported by *Elsas* and *Krahnen* (2000). They find that low competition among banks increases the probability that the bank initiates a workout in the case of distress.

However, investment in restructuring know-how is not per se desirable. Instead, it has to be compared with the efficiency effects of pledging outside collateral. Doing this, we can establish two important results. First, outside collateralization should be less attractive if banks enjoy market power. This finding is consistent with *Berger* and *Udell* (1995) who suggest that strong banks require little collateral. Second, independently of market structure, outside collateral and investment aimed at preserving the value of the inside assets are substitutes. Such a negative relationship is supported by *Brunner* and *Krahnen* (2000). Studying workouts carried out by German banks, they report that outside collateral is almost irrelevant in workouts. The majority of firms undergoing a restructuring process, however, has pledged inside collateral. This is consistent with the fact that banks invest in restructuring know-how in order to protect the value of their inside collateral.

To test the robustness of our results we allow for human capital that can be invested either inside or outside the firm (*Berkovitch, Israel* and *Zender*, 1997). The first investment increases the firm's value, the latter increases the value of the entrepreneur's outside option. Although the bank's restructuring know-how reduces the entrepreneur's incentive to invest in firm-specific expertise since the entrepreneur looses his firm more often, the basic results are robust to that extension.

There are other models that address the question of benefits and costs of relationship lending (for example *Longhofer* and *Santos* 2000). But, to our knowledge, there is no research which focuses explicitly on the accumulation of restructuring know-how. Moreover, the question of how out-

side collateral and investment aimed at preserving the value of firm's inside assets influence one another has not up to now been investigated. This is particularly relevant for empirical research. Discovering a negative relation casts doubts on the reliability of empirical results concerning the reasons for debt securization if these results are derived without distinguishing between the two types of collateral. To develop our arguments, we proceed by outlining the model. All proofs are relegated to the appendix.

II. The Model

Consider a risk–neutral bank, which is asked to finance a profitable risky project with initial investment I. The entrepreneur has no liquid funds to undertake it. Provided the entrepreneur does manage the project, it yields the high return X_s with probability p and the low outcome X_f with probability $1-p$. The returns are private information to the entrepreneur. The bank only receives the information after transfer of control. At the contracting date, two options $k \in \{0, S\}$ are available to the bank. It may either confine itself to only financing the project (option 0). This imposes a cost of $(1-\alpha_i)\, X_i$ with $i \in \{s, f\}$ on the bank if the right to foreclose is exercised. Or it may additionally invest the amount S and build up restructuring know-how (option S). Running a firm that is healthy may require skills different from those associated with restructuring firms in unfavorable conditions (*Berglöf* 1991). Such economies of specialization induce the bank to specialize on the restructuring of really distressed companies. For simplicity we thus assume that option S lowers the takeover cost of a truly defaulting firm to zero. The takeover value of the inside assets is then given by $\gamma_S X_f$ with $\gamma_S \geq 1$. With information collection as crucial part of the investment in restructuring know-how, it seems natural to assume that the borrower can observe S.

While the entrepreneur lacks liquid funds, he owns some amount W of private assets. Whether these assets are used as outside collateral $C \in [0, W]$ depends on their effect on the project's surplus. If the outstanding debt has been secured by pledging private assets, and bankruptcy occurs, the bank seizes the firms assets and liquidates the outside collateral. The liquidation of outside collateral causes transaction costs of $(1-\beta)\, C$. The interest rate is normalized to zero. To rule out trivial cases, we assume that the credit would be risky. With R as the credit's face value, this assumption implies $R > I > X_f + W$. Moreover we assume

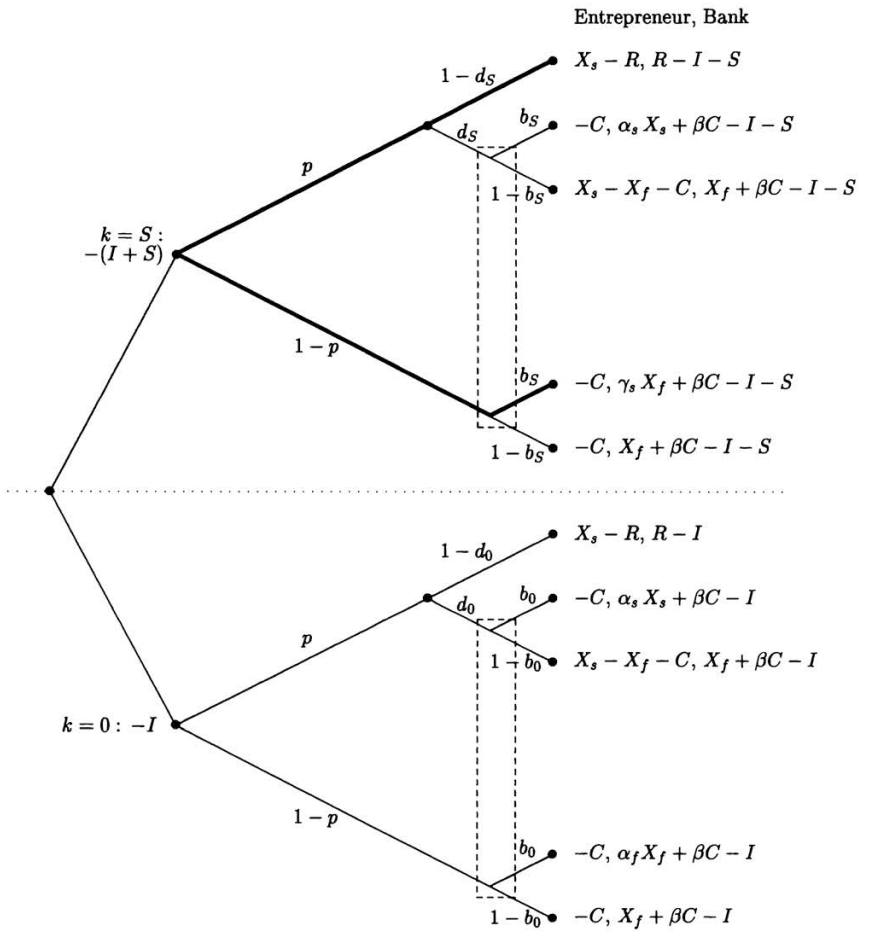

Figure 1: Restructuring know-how and renegotiation

that $p\alpha_s X_s + (1-p)\alpha_f X_f > X_f + W$. Figure 1 illustrates the game. In $t = 0$ the bank's credit policy consists of the contract (R, C), the outlay I, and the (observable) upfront investment k. In $t = 1$ the return X_s or X_f is realized. Given X_f, the owner must default. With success, however, the entrepreneur has two options. He can either repay R or pretend failure. Mixed strategies are allowed. So the entrepreneur may default with probability $d_k \in [0, 1]$. Given that default has been declared, the bank either reduces the repayment to X_f or imposes bankruptcy. In the first case, the owner keeps control over the project and receives $X_s - X_f - C$ in strategic default and $-C$ in liquidity default. In the case of bankruptcy,

the owner loses both the project and the outside collateral. The probability that the bank actually imposes bankruptcy is denoted by $b_k \in [0,1]$.

For a start, suppose $k = 0$. As *Bester* (1994) proved, there exists only an equilibrium in mixed strategies in this subgame. In this equilibrium the entrepreneur makes the bank indifferent between takeover and renegotiation. That implies that the entrepreneur's equilibrium probability of strategic default is

$$d_0 = \frac{(1-p)(1-\alpha_f)X_f}{p(\alpha_s X_s - X_f)}.$$

The bank makes the entrepreneur indifferent between repayment and default. That behavior yields

$$b_0 = \frac{R - C - X_f}{X_s - X_f}$$

as the equilibrium probability of taking over. Let us now turn to the case $k = S$. With restructuring know-how the equilibrium strategies change dramatically. Since $\gamma_S \geq 1$ the bank at least weakly prefers takeover to renegotiation in state $i = f$. If $i = s$ it strictly prefers to take over as $\alpha_s X_s > X_f$. Thus $b_S = 1$ is the bank's dominant strategy. Takeover with certainty, however, implies $d_S = 0$, which in turn induces $b_S = 1$. Sequential rationality leads to consistent beliefs and the equilibrium strategies are $d_S = 0$ and $b_S = 1$. In the case of success, the entrepreneur pays back R. If the project has failed, the bank seizes both the firm's (inside) assets and the outside collateral provided that this was pledged ex ante. Essentially the investment in restructuring know-how corresponds to the Bester (1994) assumption of no renegotiation. However, the pure threat never to renegotiate lacks credibility. Since renegotiation is superior if the project is unsuccessful, the bank needs a device that makes the threat credible. Restructuring know-how is that device. Since it removes the bottleneck of a inefficient takeover it gives the bank credibility in its precommitment of remaining tough.

III. The Optimal Contract

We consider the dominant position of the bank as a general feature of the loan market for small and medium-sized companies (see also *Berger* and *Udell* 1995). Therefore, we start our analysis by assuming that (R, C) is a take-it-or-leave-it offer made by the bank. Given d_k and b_k, the owner's expected payoff equals $\Pi_k = p(X_s - R) + (1-p)(-C) - \pi$ where π

is the entrepreneur's outside option.[1] Define $\lambda = 1$ if $k = 0$ and $\lambda = \gamma_S$ if $k = S$. By setting $\Pi_k = 0$ and solving for R we obtain the bank's profit

$$G_k = p(1-d_k)\left(X_s - \frac{\pi}{p}\right) + (1-p+pd_k)\lambda X_f + \left((pd_k + 1 - p)\beta - (1-d_k)(1-p)\right)C - (I+k). \tag{1}$$

In the optimum the entrepreneur pledges

$$C = \begin{cases} W & \text{if } \beta \geq \hat{\beta}_k \\ 0 & \text{if } \beta < \hat{\beta}_k \end{cases} \quad \text{with } \hat{\beta}_k \equiv \frac{(1-d_k)(1-p)}{pd_k + 1 - p}. \tag{2}$$

As Π_k shows, the owner must be fully compensated for the expected loss of private wealth. The bank's payoff from liquidation of C, however, is only a portion βC so that outside collateralization creates, on the one hand, a deadweight loss. On the other hand, it reduces the probability of inefficient takeover. These effects are exactly balanced if $\beta = \hat{\beta}_k$. Inserting d_S in (2) reveals that a bank which invested S (S–bank) never requires $C > 0$. To understand this general abstention, consider the costs and benefits of outside collateral for the two bank types, S–bank and 0–bank. A 0–bank has to bear the deadweight cost $(1-\beta)C$ but also receives benefits from outside collateralization such as a less attractive strategic default and a smaller probability of inefficient takeover b_0. These cost balancing effects do not exist for an S–bank. Restructuring know-how has already made sure that the owner tells the truth and that takeover is efficient. Therefore a contract without outside collateral guarantees a higher surplus.

In order to analyze whether the bank's position in the loan market influences its decision on investing in restructuring know-how, we turn now to the opposite market structure. Given many competing banks, the entrepreneur offers the contract (R, C). He suggests either a contract that compensates the bank for both the upfront investment S and the credit I, or he offers a contract that just allows the bank to break even on I. With the bank's break even condition

$$R = \frac{I + k - (1 - p + pd_k)(\lambda X_f + \beta C)}{p(1-d_k)} \tag{3}$$

[1] Since the entrepreneur's management is necessary to create positive returns, π is an opportunity cost which only arises if expected returns cover at least I plus π. We think of π as the wage that is achievable if the entrepreneur works as employee but it can be any kind of reservation utility.

we derive the owner's profit function as

$$\Pi_k = pX_s - \frac{I+k}{(1-d_k)} + \frac{(1-p+pd_k)(\lambda X_f + \beta C)}{(1-d_k)} - (1-p)C - \pi. \tag{4}$$

It is easy to recognize that (2) also applies to (4). So the efficiency of pledging outside collateral is not directly dependent on market structure. As we shall see, however, the distribution of market power indirectly influences agreements concerning collateral.

IV. Ex Ante Bargaining Power and Restructuring Know-how – The Case Without Collateral

To identify the specific impact of market power, we concentrate first on contracts without component C. Such contracts appear if $\beta < \hat{\beta}_0$. To keep the contracts separate, we call a contract determined by the bank a *lender's contract* and its counterpart determined by the entrepreneur an *owner's contract*.

Proposition 1 *Independently of its market power, the bank always invests in restructuring know-how if* $S < S_{\min} \equiv (d_0 W - (1-p)(1-d_0)(1-\gamma_S)X_f)/(1-d_0)$. *If* $S \geq S_{\max} \equiv d_0 p(X_s - X_f) - (1-\gamma_S)(1-p)X_f$ *the specific know-how is never built up.*

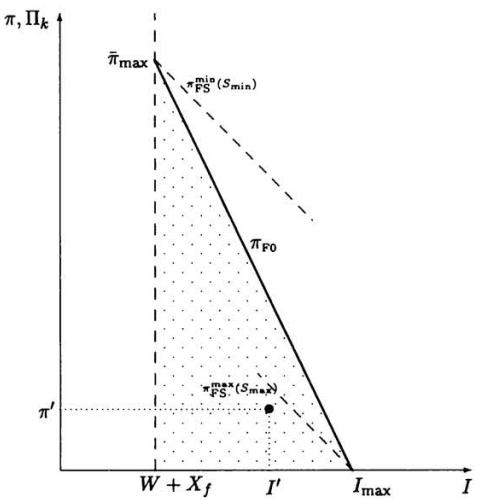

Figure 2: The limits for offering a restructuring contract

In every given market structure, the return on the investment in restructuring know-how is the avoidance of a profit decreasing transfer of control. Therefore, if the investment costs little in terms of the overall project returns ($S < S_{\min}$), every feasible project $[\pi, I]$ will be financed with restructuring know-how ($G_S > G_0$ and $\Pi_S > \Pi_0$). In contrast, with $S_{\max}$ the returns are low compared to its costs ($G_S \leq G_0$ and $\Pi_S \leq \Pi_0$). Thus, the know-how is never built up. Investment in restructuring know-how is more attractive, the more effective the bank's restructuring. Thus both limits, $S_{\min}$ and $S_{\max}$, increase in γ_S.

Figure 2 shows the irrelevance of the creditor's market position referred to $S_{\max}$ and $S_{\min}$. The figure reflects both the owner's profit if he determines the contract and the bank's profit if it determines the contract. Start with the bold line. π_{F0} represents all combinations of π and I for which $k = 0$ ($\lambda = 1$), and both the lender's and the owner's contract yield zero profit to the proposing party. The area below π_{F0} represents different types of feasible projects. The vertical distance between π_{F0} and the outside option π' shows the profit from an owner's contract Π_0 for the project $[\pi', I']$.[2] The horizontal distance between π_{F0} and the investment I' describes the profit G_0 from a lender's contract. Note that for $\pi = 0$ the function Π_0 corresponds to the profit function in Bester (1994).

For $k = S$ the function $\Pi_S = 0$ defines the Pareto-frontier π_{FS}. The lower S is, the more π_{FS} shifts upwards. $\pi_{FS}^{\min}$ describes the curve for $S_{\min}$. Note that both the vertical distance between $\pi_{FS}^{\min}$ and a given reservation utility π and the horizontal distance between $\pi_{FS}^{\min}$ and a given investment I is larger than the corresponding distances with respect to π_{F0}. Thus $\pi_{FS}^{\min}$ guarantees a higher profit for every given project $[\pi, I]$ than the bold curve π_{F0}, no matter who is in the position to determine the contract. General superiority of the renegotiation contract without restructuring

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[2] Solving $\Pi_0 = pX_s - I/(1-d_0) + ((1-p+pd_0)X_f)/(1-d_0) - \pi = 0$ for π and $G_0 = p(1-d_0)(X_s - \frac{\pi}{p}) + (1-p+pd_0)X_f - I = 0$ for I yields the non-restructuring Pareto-frontiers $\pi_{F0}(I)$ and $I_{F0}(\pi)$. π_{F0} has a slope of $\Delta = -1/1 - d_0 < -1$ with respect to I. $I_{F0}(\pi)$ with a slope of $1/\Delta$ with respect to π. In a Π_k, G_k-diagram with the independent variable π (lender's contract) on the vertical axis and the independent variable I (owner's contract) on the horizontal axis, $I_{F0}(\pi)$ and $\pi_{F0}(I)$ are identical graphs denoted as π_{F0} in the Figure. Suppose $I = I'$. For $\pi = 0$ we have $\Pi_0(I') = \pi_{F0}(I')$. Thus for any $\pi > 0$ the owner's profit Π_0 must be represented by the vertical distance $\pi_{F0}(I') - \pi$. For the particular project $[I', \pi']$ the profit is $\pi_{F0}(I') - \pi'$. In case of a lender's contract and $I = 0$ we have $G_0 = I_{F0}$. Thus for any $I > 0$ the horizontal distance $I_{F0}(\pi') - I$ reflects the bank's profit G_0. In our specific case this is $I_{F0}(\pi') - I'$. If $k = S$ the function $\Pi_S = G_S = pX_s + (1-p)\gamma_S X_f - \pi - I = 0$ defines the Pareto-frontiers $\pi_{FS}(I)$ and $I_{FS}(\pi)$ with a slope of -1. The graphs are identical. Thus $\pi_{FS}(\pi') - I'$ represents G_S and $\pi_{FS}(I') - \pi'$ represents Π_S.

investment is attained in the case of the inner broken line π_{FS}^{max} which represents $S = S_{max}$.

In reality, neither one extreme, i.e. banks principally build up restructuring know-how, nor the other, that banks always leave out the specific investment, is observable. We therefore concentrate in the following sections on the cost interval (S_{min}, S_{max}). By defining

$$I^* \equiv \frac{(1-p)(1-\gamma_S(1-d_0))+pd_0}{d_0} X_f + \frac{1-d_0}{d_0} S \quad \text{and}$$

$$\pi^* \equiv p(X_s - X_f) - \frac{(1-p)(1-\gamma_S)X_f + S}{d_0}$$

we can prove that market structure matters.

Proposition 2 *Given that $S \in (S_{min}, S_{max})$ a bank financing a project with $[\pi < \pi^*, I < I^*]$ builds up restructuring know-how if, and only if, it determines the contract.*

Depending on the market structure, the financing of one and the same project differs. In the case of a lender's contract, the financing of the project $[\pi < \pi^*, I < I^*]$ is accompanied by investment in restructuring know-how. In the alternative market structure, however, the owner of a project $[\pi < \pi^*, I < I^*]$ never offers a contract which includes the compensation for such an investment. What creates this asymmetry? The repayment R is the crucial factor, because the market structure fixes its amount. To realize this, assume restructuring know-how is not available. Consider an owner with a low outside option. A bank with market power can enforce a contract which grants itself a big slice of the project's returns. The high repayment obligation, however, distorts the owner's incentive to behave in accordance with the original contract. To counterbalance the ex post bias in favor of strategic default, the bank has to increase the probability of takeover b_0. This reaction lowers profits since transfer of control is costly. In such a situation, the ability to restructure is extremely useful, for it eliminates an inefficient, profit-decreasing, transfer of control.

With an owner's contract the initial investment I rather than the reservation utility π is crucial. A competing bank can never demand a high repayment if the project is only moderately expensive. But ex post breaching of the contract with low R is only slightly attractive for the entrepreneur. So the bank can afford to keep the probability of takeover at a low level. Since inefficient transfer of control seldom occurs, the costly accumulation of restructuring know-how is not profitable.

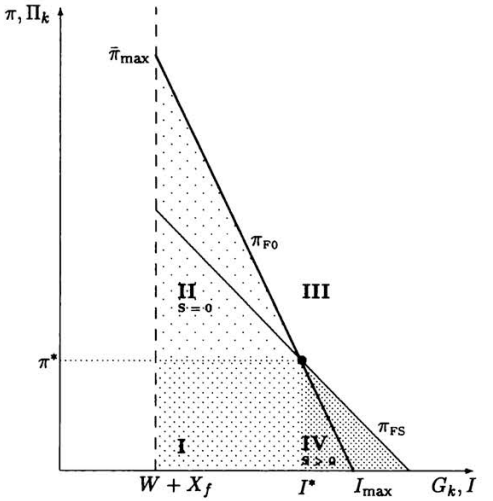

Figure 3: Market power and restructuring know-how

Proposition 3 *Feasible projects with initial investment $I > I^*$ are exclusively financed by an S–bank, whereas projects with $\pi \geq \pi^*$ are exclusively financed by a 0–bank.*

Feasible projects with $[\pi < \pi^*, I > I^*]$ are accompanied by a high repayment R in both market structures. No matter who determines the contract, inefficient takeover occurs with a sufficiently high probability given such a project. Thus the project's surplus is greater in the presence of restructuring know-how than in its absence.

Figure 3 summarizes Proposition 2 and 3. The intersection of the Pareto-frontiers π_{FS} (restructuring contract) and π_{F0} (non-restructuring contract) is defined by the project $[\pi^*, I^*]$. Projects in the plain region III yield negative profits in both market structures and with both types of contract. They are not feasible. The project $[\pi^*, I^*]$ divides the area of feasible projects into three subareas.[3] Start with area IV, the one containing feasible projects earmarked by $\pi < \pi^*$ and $I > I^*$ and thus accompanied by a high repayment R in both possible market structures. Since in this region inefficient takeover occurs with sufficiently high probability the project's surplus is greater in the presence than in the absence of re-

[3] Note that $S = S' \equiv (1-p)(\gamma_S - \alpha_f)X_f \in (S_{min}, S_{max})$ yields $I^* = p\alpha_s X_s + (1-p)\alpha_f X_f$ and $\pi^* = p(1-\alpha_s)X_s$. Thus $\Pi_S(S')$ corresponds to the profit achievable with a precommittment not to renegotiate in *Bester* (1994).

structuring know-how. Take now area II. Due to a low probability of costly transfer of control, projects in this area never induce investment in restructuring capability. In region I projects show a repayment obligation that depends on market structure. Restructuring capability is only built up here in case of a lender's contract.

Up to now, when dealing with an owner's contract, we have implicitly assumed that restructuring investment is verifiable and thus can be made part of (R, C). Since standard debt contracts rarely have such a feature, the results obtained so far would be supported if that assumption could be dropped. Proposition 4 states that this omission is possible.

Proposition 4 *Even if the restructuring investment is not contractible, the bank invests S whenever the entrepreneur offers a contract with restructuring know-how.*

The incentive compatibility of restructuring know-how has the following intuition. The owner offers a restructuring contract only if the bank's future ability to restructure the project enhances the net surplus. By reducing the repayment, the entrepreneur appropriates the whole expected additional net surplus in advance. The bank should be able to avoid the withdrawal of its payoff slice by being efficient in the event of takeover, and thus ruling out strategic default. But if it fails to invest S, restitution is not possible and negative expected net returns turn out to be compulsory. Thus, for all $I > I^*$, the bank has no incentive to deviate from an owner's contract with restructuring know-how.

Note that Proposition 2 and 3 still apply if we drop the assumption that the entrepreneur owns no liquid assets. Consider an entrepreneur with a fixed investment size Ω and liquid assets $A < \Omega$ who is in the position to offer the contract. The bank's total financial engagement I is defined by $\Omega - A = I$. An increase in personal liquid assets of one unit $\Delta A = 1$ increases the project's profit of $d_0/(1 - d_0)$ if a non-restructuring contract is offered. The reason is that ΔA reduces R and increases the opportunity costs of strategic default. With a restructuring contract $\Delta A = 1$ has no impact on the profit since the entrepreneur's ex post moral hazard is already ruled out.

The lower R the higher the opportunity costs of strategic default. Thus if the entrepreneur's financing share is high, $\Omega - A < I^*$, the restructuring contract is inferior due to a low repayment obligation R. In contrast, if the entrepreneur's liquid wealth A is so low that $\Omega - A \geq I^*$, the opportunity costs of strategic default are sufficiently low and the entrepreneur

needs to employ a disciplining instrument. He maximizes his profit by offering the restructuring contract.

In the alternative market-structure with the bank in the position to offer the contract the entrepreneur's liquid assets increase the value of his outside option. Denote the alternative wage as ω. The total value of the outside option is than $\pi = \omega + A$. Since starting the project implies giving up $\pi = \omega + A$ the entrepreneur will only start the project if the contract (R, C) enables him to break even. One unit of additional wealth, $\Delta A = 1$, forces the bank to leave with the entrepreneur $\omega + A + \Delta A$. The face value R decreases. ΔA also reduces the investment I and the bank's profit enhances by $\Delta G_0 = d_0$. This increase is financed by the reduction of the entrepreneur's ex post moral hazard induced by the lower R. If A is such that $\omega + A < \pi^*$ it pays the bank to employ an instrument that shifts the opportunity costs of false default upwards. Thus the bank offers sufficiently poor entrepreneurs only a restructuring contract.

Similar to *Holmstrom/Tirole* (1997) our model predicts that personal liquid wealth substitutes the bank's monitoring activity. If $A > \pi^* - \omega$ (lender's contract) or $A > \Omega - I^*$ (owner's contract) a restructuring contract will never be offered. However, for all feasible projects with $[\Omega > I^*, \omega < \pi^*]$ there exists a range $\hat{A} \in [0, \bar{A}(\omega)]$ such that for all $\hat{A}$ complementary bank financing is only achievable if the entrepreneur offers a restructuring contract. With a non-restructuring contract the bank can never break even on the fairly large credit $\Omega - \hat{A}$. Thus it rejects the offer to co-finance the project. This result is also closely related to *Holmstrom/Tirole* (1997). The authors point out that capital-poor entrepreneurs are able to achieve outside finance if, and only if, parts of the financing comes from a monitoring intermediary. The monitoring prevents excessive ex post moral hazard on the entrepreneur's side and increases the financing capacity of the project. Restructuring know-how works in a similar way. Since it rules out strategic default it increases a large project's expected gross profit, and enables the bank to finance a large share of the initial outlay Ω.

V. Restructuring Know-how or Outside Collateral?

According to equation (2) outside collateral has an impact on equilibrium contracts if it is sufficiently valuable, that is $\beta \in (\hat{\beta}_0, 1)$. Consequently, the conditions for the superiority of restructuring know-how may alter in this range. The inspection of these conditions provides us

with interesting insights into the relationship between restructuring know-how and outside collateral.

Proposition 5

a) Given that $\beta > \hat{\beta}_0$, the number of projects financed with restructuring know-how is negatively related to β. This result is invariant to market structure.

b) For a given $\beta > \hat{\beta}_0$ the number of projects financed with outside collateral is lower with a lender's contract than with an owner's contract.

Proposition 5 indicates that outside collateral and restructuring know-how are substitutes. The result has the following intuition. The valuation parameter β is negatively related to the credit's face value R. The sign of the impact of R on the probability of strategic default and inefficient takeover, however, is positive. Thus if the bank upgrades its valuation of the outside collateral, the probability of inefficient takeover is reduced and the project's profit goes up. If β decreases, profits move in the opposite direction. The net surplus of a contract with outside collateral, however, represents the opportunity cost of a contract with restructuring know-how. Consequently, any variation of β alters the project which keeps both contracting parties indifferent between restructuring and collateralized contracts. With $\beta(1 - p + pd_0) - (1 - d_0)(1 - p) \equiv v > 0$, the zero profit curve π_{F0} is shifted to the right in Figure 4.

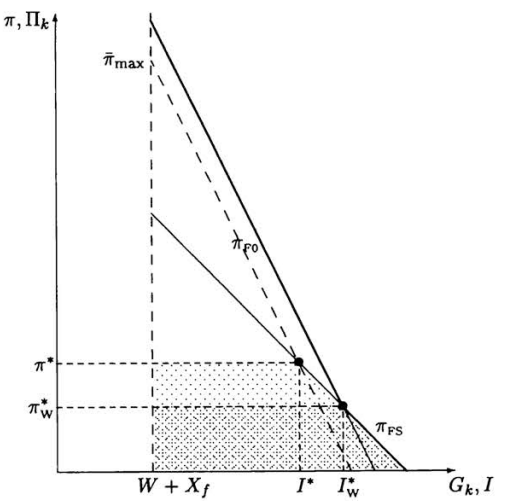

Figure 4: The substitution effect of outside collateral

The indifference project is described by $\pi^*{}_W = \pi^* - v\,W/d_0$ and $I^*{}_W = I^* + v\,W/d_0$. An owner's contract induces accumulation of restructuring know-how for all feasible projects with $I > I^*{}_W$. Given a lender's contract, the upfront investment occurs for all projects with $\pi \in [0, \pi^*{}_W)$. Opportunity costs are positively related to the magnitude of β. Therefore, in both market structures, the number of projects which may be financed with restructuring know-how varies inversely with the bank's valuation of the private assets. Due to this substitution result, we would expect a negative relationship between pledging outside collateral and restructuring know-how in empirical terms. The conjecture is supported by *Brunner* and *Krahnen* (2000). They find that outside collateral is a rather rare phenomenon in workouts carried out by German banks.

For all projects $[I < I^*{}_W, \pi < \pi^*{}_W]$, outside collateralization only arises if the banks compete for the project. Given that the bank has market power, the effect of outside collateral on the credit's face value is too small to make restructuring know-how unprofitable. Thus the pledging of outside collateral should be observed less often if banks have a strong position in the loan market. This result is consistent with *Berger* and *Udell* (1995). They claim that collateral requirements are lower with stronger banks.

VI. An Extension: Human Capital Investment

So far the entrepreneur had no possibility to influence the outcome of his project. In this section we adopt a more realistic approach. Following *Berkovitch, Israel* and *Zender* (1997) we assume that the entrepreneur can invest in the project's success. Consider an entrepreneur who owns one unit of human capital which he may deploy either inside or outside the firm. If invested in firm-specific expertise it increases the firm's expected value. If invested in general expertise it increases the entrepreneur's outside option. The entrepreneur gains private benefits from controlling the firm. Since private benefits are not contractible the financier's cashflow remains unaffected.

Increasing the investment in general expertise at the expense of firm-specific expertise is an insurance against the risk of losing the firm in bankruptcy. This insurance may influence the entrepreneur's incentives to offer a restructuring contract. To discuss this issue formally we concentrate on a credit market with the entrepreneur in the dominant position. We assume that the investment in firm-specific expertise $h \in [0, 1]$ increases $X_s(h)$ whereas the investment $1 - h$ in general expertise in-

creases the value of the outside option $\pi(1-h)$. As before π is the wage achievable in an alternative employment. Denote the optimal investment as h_0^* and the maximum value of the outside option as π_m. The entrepreneur has only an incentive to invest in firm-specific expertise if $B + X_s(h^*) - R(h^*) > \pi_m$. We assume that this condition is satisfied. Both types of investments show positive but decreasing marginal returns. To save space we denote the outside option as $\pi(h)$ with $\partial\pi(h)/\partial h < 0$ and $\partial^2\pi(h)/\partial h^2 < 0$. We assume $\partial\pi(0)/\partial h = 0$ and $\partial X_s(1)/\partial h = 0$. If the entrepreneur invests exclusively in firm-specific capital the outside option is $\pi(1) = 0$. The entrepreneur's benefit from controlling the firm is B. We exclude the case of an entrepreneur leaving the unsuccessful firm voluntarily, that is we consider only ranges of h where $\pi(h) - B < 0$.

Consider at first a non-restructuring contract offer. Since h has no impact on the structure of the bank's returns the probability of strategic default remains structurally unchanged but depends on h: $d_0(h)$. The entrepreneur's indifference condition $b_0(\pi(h) - C) + (1 - b_0)(B + X_s(h) - X_f - C) = B + X_s(h) - R(h)$ results in

$$b_0(h) = \frac{R(h) - X_f - C}{B + X_s(h) - X_f - \pi(h)}.$$

Inserting $d_0(h)$ in equation (3) and differentiating it for h reveals that the debt's face value R decreases with h. Thus both equilibrium strategies must decrease in h: $\partial d_0/\partial h < 0$ and $\partial b_0/\partial h < 0$. The higher the successful project's cashflow the less is the entrepreneur inclined to risk loosing his project, and the higher the entrepreneur's gain from telling the truth the less is the bank forced to punish the entrepreneur. The entrepreneur's expected profit is

$$\Pi_k = p(B + X_s(h) - R) + (1-p)(b_k\pi(h) + (1-b_k)B - C). \tag{5}$$

Both the probability of loosing the project and the investment in general expertise define the expected value of the entrepreneur's outside option. The first order condition (FOC)

$$p\left(\frac{\partial X_s}{\partial h} - \frac{\partial R}{\partial h}\right) = -(1-p)\left(\frac{\partial b_k}{\partial h}(\pi(h) - B) + b\,\frac{\partial \pi}{\partial h}\right) \tag{6}$$

determines the profit maximizing investments h_k^* and $1 - h_k^*$ in firm-specific and general expertise respectively. In a first step we assume that the entrepreneur has no private wealth, $W = C = 0$. The left-hand side of the FOC represents the marginal return from h. Obviously it is smaller with

a restructuring contract since in this case $\partial R/\partial h = 0$. The right-hand side shows the marginal net loss. In case of a non-restructuring contract it consists of two components. The expression $-(1-p)\,(\pi(h) - B)\,\partial b_0/\partial h < 0$ represents the marginal net gain resulting from an increased probability of remaining in control. $-(1-p)\,b_0\,\partial\pi/\partial h > 0$ is the loss from a reduced value of the outside option. With a restructuring contract the marginal loss of investing a greater proportion of his human capital in firm-specific expertise is $-(1-p)\,\partial\pi/\partial h > 0$.

Proposition 6 *A non-restructuring contract induces more investment in firm-specific expertise than a restructuring contract, that is* $h_0^* > h_S^*$.

The intuition is straightforward. With a restructuring contract the entrepreneur has to rely on his outside option more often if the project fails. This higher need to insure himself against failure increases the opportunity costs of investing in firm-specific expertise, and lowers his incentive to allocate h to the firm. In addition the firm specific investment does not help to reduce the repayment R. Expressed in a more technical way, a non-restructuring contract produces higher marginal returns and smaller marginal losses than a restructuring contract. Thus, the entrepreneur's human capital investment in firm-specific expertise must be higher if he offers a non-restructuring contract.

Suppose $S = 0$ yields $\Pi_S(h_S^*, S = 0.I) > \Pi_0(h_0^*, I)$. Since the profit $\Pi_S(h, S, I)$ decreases with S this inequality implies that despite $h_0^* > h_S^*$ there exists a level $S = \bar{S}$ such that the entrepreneur is just indifferent between the two types of contracts,

$$\Pi_0(h_0^*, I) = \Pi_S(h_S^*, \bar{S}, I).$$

Denote R', X_s' and π' as the derivatives with respect to h, and $N = B + X_s - X_f - \pi$. The impact of I on the marginal profits is defined by

$$(7) \qquad -p\frac{\partial R'}{\partial I} + (1-p)\frac{\pi - B}{N^2}\left(\frac{\partial R'}{\partial I}N - \frac{\partial R}{\partial I}X_s'\right) + (1-p)\frac{\partial R}{\partial I}\frac{X_s - X_f}{N}\frac{\pi'}{N} \gtrless 0$$

For $h = 0$ and $\pi' = 0$ the derivation is positive. $h = 1$ yields $X_s' = 0$ and $\partial R'/\partial I = 0$, and the derivation is negative. We assume that any profit function $\Pi_0(h, I)$ behaves properly. That is, it shows monotonically decreasing returns and has no turning point in the relevant range. Given this property the marginal profit functions $\Pi_0'(h, I)$ and $\Pi_0'(h, I + \Delta I)$ can only cut once. This feature implies that there exists a unique $\tilde{h} \in (0, 1)$

such that (7) is zero. For $h > \tilde{h}$ the third expression dominates. Given that marginal profit are positive for $\tilde{h}$ this feature implies for $k = 0$ that ΔI lowers the incentive to invest in firm-specific expertise. The intuition is that ΔI increases the opportunity cost of investing in firm-specific expertise since it increases the risk of loosing the firm. Note that in case of a restructuring contract ΔI does not affect the marginal profits.

ΔI decreases the profits of a non-restructuring contract more than the profits of a restructuring contract. The reason is twofold. First, the increase in R is larger since the bank receives the repayment only with the probability $p(1 - d_0) < p$. Second, ΔI causes an additional loss since it reduces the probability of remaining in control and receiving B. This second effect is absent in case of a restructuring contract. Consequently, a higher initial credit reduces the expected profit from a non-restructuring contract more than the expected profit from a restructuring contract for every given h. That is $\Pi_0(h_0^*(I + \Delta I), I + \Delta I) < \Pi_S(h_S^*, \bar{S}, I + \Delta I)$. As in the basic setting, a restructuring contract is the more attractive the higher the initial outlay I.

Consider now the case with $W > 0$. In this case pledging of outside collateral C is possible. Rearranging and differenting the first order condition (6) with respect to C yields

$$-p\frac{\partial R'}{\partial C} + (1-p)\frac{\pi - B}{N^2}\left(\frac{\partial R'}{\partial C}N - (\frac{\partial R}{\partial C} - 1)X_s'\right) + (1-p)\left(\frac{\partial R}{\partial C} - 1\right)\frac{X_s - X_f}{N}\frac{\pi'}{N} \gtreqless 0.$$

For $h = 0$ and $\pi' = 0$ the derivation is negative. $h = 1$ yields $\partial R'/\partial C = 0$ and $X_s' = 0$, and the derivation is positive. If every profit function $\Pi_0(h, C, \beta), C \geq 0$ behaves properly there exists an unique $\bar{h} \in (0,1)$ such that the derivation is zero. Given that $\bar{h}$ yields a positive marginal profit the derivation implies that pledging collateral favors the investment in firm-specific expertise. This is basically because the expected opportunity cost of the h-investment are lower for an entrepreneur who pledges outside collateral. Pledging guarantees that a low value of the outside option is less important since the entrepreneur is less likely to loose his venture.

Despite its positive effect on the firm-specific investment, however, debt securization does not occur unconditionally. Optimal pledging requires that outside collateral shifts the total profits upwards. Differentiating the profit function Π_0 with respect to C yields

$$\beta\frac{1 - p + pd_0(h_0)}{p(1 - d_0(h_0))}\frac{p(X_s(h) - X_f) + B - C}{B + X_s(h) - X_f - \pi(h)} - (1-p)\frac{X_s(h) - X_f}{B + X_s(h_0) - X_f - \pi(h)} \lesseqgtr 0.$$

For any given h_0 the expression on the left-hand side is positive if $\beta = 1$, and it is negative for $\beta = 0$. Moreover the total profit increases with β. Monotonicity of marginal and total profits in β guarantees that there exists a range $\beta \in [\tilde{\beta}_0, 1]$ such that for all $\beta \geq \tilde{\beta}_0$

$$\Pi_0(h_0^*, I) \leq \Pi_0(h_0^*(C, \beta), I).$$

This feature implies that the substitutional relationship between outside collateral and restructuring know-how is robust with respect to the investment in firm-specific expertise.

VII. Insolvency Codes

In our model the manager has an information advantage that he can use strategically. If the bank is either not in a position or has no incentive to punish the entrepreneur he would default unconditionally, regardless whether he has invested in firm-specific expertise or not. Unconditional default and lack of punishment reduces the debt capacity of the venture to the low value x_f. As a consequence positive net present value projects that need $I > x_f$ would never be financed. To increase the debt capacity the optimal insolvency code has to provide the bank with an instrument to punish severely. The most severe punishment is to take the firm away from the entrepreneur. Note that bank control is never efficient in strategic default and even in liquidity default efficiency of bank control depends on the bank's ability to restructure the firm, and also on the entrepreneur's private benefit from control. But investor protection and a high debt capacity is only compatible with a credible threat to take over. Thus the insolvency code should allow for a change of control but induce the bank to minimize the distortions from takeover.

Our model suggests that it is inefficient to allow the bank to declare bankruptcy unconditionally. Since the bank has an incentive to take the firm away from the entrepreneur the bank's right to declare bankruptcy should be conditioned on the trigger "default on the debt payment". Based on these considerations the optimal bankruptcy code provides for the following mechanism:

- If the entrepreneur declares bankruptcy the court allows the entrepreneur to make a take-it-or-leave-it offer to the bank. If the creditor rejects the offer, the court hands over ownership and control of the firm to the bank. If the creditor accepts the offer, it becomes the new debt contract and the entrepreneur remains in control.

- If the bank declares bankruptcy the court checks whether the declaration is justified. If it is not justified the old contract remains into effect. If it is justified the court hands over ownership and control of the firm to the bank.

Given the entrepreneur declares bankruptcy the renegotiation process is initiated by the court. With the bank declaring bankruptcy renegotiation takes place privately and the court comes only into play if the bank rejects debt forgiveness and the renegotiation fails. In any case the central piece of the insolvency code is a maximum level of creditor protection (*La Porta* et *al.* 2000). After renegotiation has failed the bank is entitled to receive all the further proceeds from the firm. Moreover, since any profits from taking on the firm's control remain with the bank, maximum creditor protection provides the bank with the highest incentive to minimize takeover costs and to invest in restructuring know-how.

As seen above the priority of creditor protection in the insolvency code is the more valuable the higher the bank's engagement in the firm and the less the entrepreneur finances on his own. Thus our finding suggest that in a bank-based system where firms rely heavily on bank credit the insolvency code should be creditor-oriented. This is consistent with the findings of *Berkovitch* and *Israel* (1999) who suggest that bank-based systems should have only a creditor chapter which entitles the creditors to all the post-bankruptcy proceeds. They also point out that a debtor chapter which entitles the debtor to the post-bankruptcy proceeds is inefficient if the entrepreneur has a strategic advantage.

Real insolvency codes might be classified as either creditor-oriented or debtor-orientated. The less creditor-oriented the code is the more it deviates from the mechanism suggested above, and the higher is the debtor's share of the post-bankruptcy proceeds. In Germany's bank-based system both, the creditor and the debtor are allowed to file for bankruptcy. Only the debtor is allowed to file for reorganization. The creditor can file if default on debt has occurred. In both cases the entrepreneur looses control and a trustee is appointed. The code allows for debt forgiveness and continuation under a new management (reorganization) but only if the creditors agree. If the creditors reject such an offer the trustee liquidates the firm.

The German bankruptcy procedure is highly creditor-oriented without formally handing over the firm's assets and control to the creditors. However, since the entrepreneur looses control and the creditors have the right to veto all decisions about the firm's future the creditors are in fact the party in control. As they are entitled to nearly all post-bankruptcy

proceeds as long as their claims are not settled creditors have a strong incentive to protect the firm from devaluation and initiate a bank-led reorganization.

In the market-based system in the United States the insolvency code allows for bankruptcy filing of both parties, the debtor and the creditors, too. Entrepreneurs can file for Chapter 7. This chapter provides only for an orderly liquidation of the firm's assets by a court-appointed trustee. Consequently renegotiation and debt forgiveness play no role. The priority of the creditor's claims is always maintained (*Weiss* 1993). Thus we may call Chapter 7 creditor-oriented. However, filing for Chapter 7 is rather rare. The most common bankruptcy filing is for the reorganization chapter (Chapter 11). This chapter allows the entrepreneur to remain in control, and to participate on the proceeds from reorganization by violating the priority of the creditors' claims. This bias in favor of the debtor may reflect the fact that bank finance is less important for U.S.-firms than for German firms. Since in Chapter 11 U.S.-banks do not receive the full returns of their own restructuring effort it is no surprise that bank-led restructuring has become rather uncommon in the United States (*Weiss* 1993). In contrast bank-led restructuring is quite common in Germany.

So far we have dealt with bankruptcy procedures that concern the firms assets. From our findings in section *V* we know, however, that the treatment of outside collateral in a bankruptcy procedure is equally important. Outside collateral increases the entrepreneur's incentive to repay his debt according to the original contract. This feature is the reason behind the substitutional relationship between outside collateral and restructuring know-how. However, outside collateral is only pledged if its liquidation value is sufficiently high. Any restriction imposed by the bankruptcy court increases the transaction costs and decreases the outside collateral's liquidation value. A code-induced depression of the bank's valuation of outside collateral may induce higher investment in restructuring know-how. But, as substitution of restructuring know-how for collateral is efficient, it may also cause a loss in overall wealth. To avoid this inefficiency the insolvency code should maximize creditor protection with respect to outside collateral, too. Essentially efficiency requires that the bank can liquidate the outside collateral immediately and receives any proceeds from liquidation. Consistent with these requirements the German code allows to liquidate non firm-specific assets in advance (Absonderungsrechte) and entitles the creditor to the entire proceeds from liquidating his (outside) collateral.

VII. Conclusion

Do firms lose in value if bankruptcy shifts control to the bank? In the literature, different answers can be found. On the one hand, some authors claim that there is a decrease in value as soon as the bank takes over (for example, *Diamond* and *Rajan* 2000). On the other hand, in some models, the value of the firm is not considered to be affected by the transfer of control (for example, *Zender* 1991). Certainly, banks do not, per se, possess the know-how needed to keep the firm as a going concern and manage it efficiently. But there is evidence that banks, in the process of establishing a close relationship to the firm, spend resources to build up restructuring know-how and have it ready for the event of default. By the time the default actually occurs, the cost of acquiring the restructuring capability is already sunk and the transfer of control to the bank is efficient. This paper clarifies the factors which induce banks to make such an investment. We prove that the ex ante bargaining position of the contracting parties is crucial for the bank's decision. Our model also provides evidence that outside collateral and restructuring know-how are substitutes. Both qualitative results are robust. They hold with restructuring success, depending on S and a bank's quality index Q, if $\gamma_S(S,Q)$ shows positive but decreasing returns in S and positive returns in Q. Moreover, the results also hold when collateral is seized only in the case of a revealed strategic default. Since this lowers the costs of outside collateral, contracting parties prefer to pledge it for every $\beta > 0$. Thus restructuring know-how and outside collateral are substitutes in the whole range of $\beta \in (0,1)$. Finally, the substitution result is even robust if the entrepreneur's risk type is not observable ex ante (*Besanko* and *Thakor* 1987; *Schäfer* 2001). This is due to the fact that restructuring know-how increases the profit of the high risk type. Consequently, the low risk entrepreneur needs less outside collateral to separate himself.

An important issue that we leave open to future research is how the incentive to build up restructuring know-how is affected by multiple bank lending. With many lenders, explicit property rights on inside assets have to be declared in the contract. The shape of these rights determine the incentive to invest in restructuring know-how. Moreover, in distress, coordination failure of lenders may be a serious problem (*Hubert* and *Schäfer* 2002, *Brunner* and *Krahnen* 2000). If so, the profitability of restructuring know-how also depends on devices for limiting the coordination problem.

Appendix

Proposition 1 With a lender's contract, the investment should be omitted if

$$(8) \qquad G_S - G_0 \equiv \Delta G = pd_0\left(X_s - X_f - \frac{\pi}{p}\right) - (1-\gamma_S)(1-p)X_f - S \leq 0 \;\forall\; 0 \leq \pi \leq \bar{\pi}.$$

The upper boundary $\bar{\pi}$, is obtained by setting (1) for $k = 0$ to zero and solving for π. Given $\bar{\pi}$, the contracting parties are indifferent between the two alternatives, execute or drop the project. Because of $I > X_f + W$ and a negative dependence on I, its maximum is restricted to $\bar{\pi} < \bar{\pi}_{\max} = p(X_s - X_f) - W/(1-d_0)$. Since $dG_0/d\pi = -(1-d_0) > dG_S/d\pi = -1$, condition (8) holds for all π and I if it applies to the lower boundary of $[0, \bar{\pi}]$. Inserting $\pi = 0$ in (8) yields $S \geq S_{\max}$. Spending S, however, pays for every project if $\Delta G > 0 \;\forall\; \pi \in [0, \bar{\pi}]$. Inserting $\bar{\pi}_{\max}$ in $\Delta G > 0$ and solving yields $S < S_{\min}$. Consider now an owner's contract. Define $I_{\max} \equiv pX_s(1-d_0) + (pd_0 + 1 - p)X_f$ where $\Pi_0(I_{\max}, \pi = 0) = 0$. Denote a restructuring contract as $(R_S, 0)$. It is never offered if $\Pi_S - \Pi_0 \equiv \Delta\Pi \leq 0 \;\forall\; I \in [X_f + W, I_{\max}]$, that is

$$(9) \qquad \Delta\Pi = \frac{d_0[I - (p + (1-p)\gamma_S)X_f] - (1-p)(1-\gamma_S)X_f}{1-d_0} - S \leq 0.$$

It is sufficient to show that (9) applies to the upper boundary of $[X_f + W, I_{\max}]$ since

$$(10) \qquad d\Pi_S/dI = -1 > d\Pi_0/dI = -1/(1-d_0).$$

Inserting $I_{\max}$ and rearranging (9) with respect to S reveals $S \geq S_{\max}$. To identify the S, which brings about the general preferability of $(R_S, 0)$, it suffices, because of (10), to substitute $X_f + W$ for I in $\Delta\Pi > 0$ and solve for S. This yields also $S < S_{\min}$. Finally (10) guaranties $S_{\min} < S_{\max}$. △

Proposition 2 Inserting π^* and I^* in G_k and Π_k yields $\Delta G = \Delta\Pi = 0$. Because of

$$(11) \qquad d\Delta G/d\pi = -d_0 < 0 \text{ and } d\Delta G/dI = 0,$$

this implies $\Delta G > 0 \;\forall\; \pi < \pi^*$ and $\forall\; I < I^*$. However, since

$$(12) \qquad d\Delta\Pi/dI = d_0/(1-d_0) > 0 \text{ and } d\Delta\Pi/d\pi = 0$$

an owner's contract results in $\Delta\Pi < 0 \;\forall\; \pi < \pi^*$ and $\forall\; I < I^*$ △

Proposition 3 $\Delta G = \Delta\Pi = 0$ for (I^*, π^*), (11), (12) and $d\pi/dI_{|\Pi_S = 0} = -1 < 0$ ensure that $\Delta\Pi > 0$ and $\Delta G > 0 \; \forall \; I > I^*$. The same logic yields $\Delta\Pi \leq 0$ and $\Delta G \leq 0 \; \forall \; \pi \geq \pi^*$. △

Proposition 4 With $(R_S, 0)$ the repayment is $R_S = (I + S - (1-p)\gamma_S X_f)/p$. Since S is observable, a bank saving S is treated ex post like a 0–bank which results in an expected payoff of $p(1-d_0)R_S + (1-p+pd_0)X_f < I$ for all $I > I^*$ △

Proposition 5

a) Set the profit differences $G_S - G_0 = \Delta G - vW$ and $\Pi_S - \Pi_0 = \Delta\Pi - vW/(1-d_0)$ zero and solve them for π and I. This leads to $\pi^*{}_W$ and $I^*{}_W$. From $d[G_S - G_0]/d\pi < 0$ and $d[\Pi_S - \Pi_0]/dI > 0$ it follows that $G_S < G_0 \; \forall \pi > \pi^*{}_W$ and $\Pi_S < \Pi_0 \; \forall \; I < I^*{}_W$. $dI^*{}_W/d\beta > 0$ and $d\pi^*{}_W/d\beta < 0$ ensure the negative relation.

b) This follows directly from $G_S - G_0 > 0$ and $\Pi_S - \Pi_0 < 0$ for all projects $[\pi < \pi^*{}_W, I < I^*{}_W]$, and $C = 0$ if $k = S$. △

Proposition 6 The properties of the function $X_s(h)$ imply a decreasing marginal return which reaches zero for $h = 1$. For all $h < 1$ the marginal returns are smaller in case of a restructuring contract since $\partial R/\partial h = 0$. A zero marginal return for $h = 1$ implies that an optimum only exists if the marginal net loss is positive around h_k^*. Define $\hat{h}_0 \in (0,1)$ as investment level that yields $\pi(h_0) - B = 0$. Since $b_0 < 1$ the marginal loss from the outside option's devaluation is less severe in case of a non-restructuring contract. In addition, for all $h_0 \in (\hat{h}_0, 1]$ a non-restructuring contract provides for marginal gains since the risk of losing control decreases. Both facts imply that for all $h \in [\hat{h}_0, 1]$ the marginal net loss resulting from a non-restructuring contract is lower than the marginal net loss generated by a restructuring contract. For all $h \in [\hat{h}_0, 1]$ the marginal profit is lower with a restructuring contract than with a non-restructuring contract. Thus $h_0^* > h_k^*$. △

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Summary

Restructuring Know-how and Collateral

A close relationship often involves lenders in workouts for their distressed clients. Since restructuring activities need special expertise, banks must have previously accumulated restructuring know-how. We analyze the factors which induce banks to invest in restructuring know-how and explore the relationship between restructuring know-how and outside collateral. We find that banks are likely to accumulate restructuring know-how if they enjoy market power or finance a large project. Outside collateralization and restructuring know-how are substitutes. Since restructuring know-how preserves the value of the bank's inside collateral, this result indicates that empirical studies on debt securization and financial contracting need to distinguish clearly between the two types of collateral. (JEL G33, G34)

Zusammenfassung

Restrukturierungsexpertise und Kreditsicherheit

Hausbanken sind oft aktiv in die Restrukturierung und Sanierung ihrer notleidenden Firmenkunden involviert. Dieses Papier analysiert den Anreiz von Banken zum Aufbau von Restrukturierungsexpertise. Insbesondere untersuchen wir, wie diese Anreize durch Kreditsicherheiten beeinflußt werden. Unsere Ergebnisse zeigen, daß Banken einen starken Anreiz haben, Restrukturierungsexpertise aufzubauen, wenn ihre Marktmacht groß ist oder wenn sie Großkredite gewähren. Private Kreditsicherheiten und Restrukturierungsexpertise sind Substitute. Da Restrukturierungsexpertise unternehmensinterne Kreditsicherheiten vor dem Werteverfall bewahrt, ist davon auszugehen, daß zuverlässige empirische Resultate zur ökonomischen Wirkung von Kreditsicherheiten zwingend eine klare Trennung zwischen unternehmensinternen und externen Sicherheiten voraussetzen.

Résumé

Savoir-faire de restructuration et garantie de crédit

Les banques participent souvent activement à la restructuration et l'assainissement de leurs clients-entreprises en difficulté. Cet article analyse les facteurs qui incitent les banques à acquérir un savoir-faire de restructuration et explore particulièrement le rapport entre ce savoir-faire et les garanties de crédit. Les résultats montrent que les banques sont encouragées à accumuler un savoir-faire de restructuration si elles ont un pouvoir de marché important ou si elles octroient de gros crédits. Les garanties privées de crédit et le savoir-faire de restructuration sont des substituts. Comme cet dernier préserve la valeur des garanties de crédit internes à l'entreprise, le résultat indique que des études empiriques fiables sur l'effet économique des garanties de crédit doivent faire clairement la distinction entre les garanties internes et externes.