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Antje Brunner, Jan Pieter Krahnen

Center for Financial Studies
an der Johann Wolfgang Goethe-Universität ▪ Taunusanlage 6 ▪ D-60329 Frankfurt am Main
Tel: (+49)069/242941-0 ▪ Fax: (+49)069/242941-77 ▪ E-Mail: ifk@ifk-cfs.de ▪ Internet: http://www.ifk-cfs.de

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Multiple lenders and corporate distress: Evidence on debt restructuring*¤

Antje Brunner[1], Jan Pieter Krahnen[2]

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Abstract:
In the recent theoretical literature on lending risk, the common pool problem in multi-bank relationships has been analyzed extensively. In this paper we address this topic empirically, relying on a unique panel data set that includes detailed credit-fie information on distressed lending relationships in Germany. In particular, it includes information on bank pools, a legal institution aimed at coordinating lender interests in borrower distress. We find that the existence of small bank pools increases the probability of workout success and that coordination costs are positively related to pool size. We identify major determinants of pool formation, in particular the distribution of lending shares among banks, the number of banks, and the severity of the distress shock to the borrower.

JEL Classification: D74, G21, G33, G34

Keywords: Bank Lending, Bank Pool, Distress, Reorganization, Coordination Risk, Bankruptcy

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[1]Humboldt-Universitaet Berlin and CFS Center for Financial Studies, Frankfurt, Germany
Email: abrunner@wiwi.hu-berlin.de
[2]Goethe-Universitaet and CFS Center for Financial Studies, Frankfurt/Main, Germany, and CEPR.
Correspondence: CFS, Taunusanlage 6, 60329 Frankfurt/Main, Germany,
Email: krahnen@wiwi.uni-frankfurt.de

1 Introduction

In the aftermath of the 2001 Swissair debacle, Oliver Hart noted that Swissair, until recently one of the world's most respected airlines, could probably have been saved if a mechanism had been in place to engineer a coordination among all lenders, thereby avoiding the run on debtor assets [see Hart 2001]. In this paper we investigate a financial institution, the bank pool, that is able to eliminate the risk of a corporate run, and that is common in the German financial system. The bank pool is a new institution in the sense that to the best of our knowledge it has not been studied thoroughly by economists before, and it is widely unknown, even among scholars of corporate finance.

Much of the recent literature on the pricing of debt, on the design of debt contracts and, with a broader perspective, on the properties of the banking system, builds on a common theme, that is the borrower-lender bargaining process when firms are in distress, and its implications for the financing of the firm. Two strands of the literature have focussed their attention on the issue of lender coordination. Bolton and Scharfstein [1996] offer an explanation of why firms will choose more than one creditor. Multiple lenders have the advantage of lowering the firm's incentive to default strategically, and therefore increase the ex-ante probability of proper and timely repayment of debt. On the other hand, multiple lenders have the disadvantage of lowering expected payoff in liquidity default. However, the disadvantage can be reduced if lenders commit themselves to a voting rule concerning asset sale decisions. In a different setting, Morris and Shin [1999] analyze the common pool problem of multiple lenders in corporate distress. Efficient investment and liquidation decisions are not automatically guaranteed, since the incentives of lenders follow private rather than public welfare maximization. With many lenders, coordinated behavior is not easily achieved. The risk of coordination failure will be anticipated by borrowers and lenders. Coordination risk is a variant of the common pool problem, similar in spirit to Diamond and Dybvig's [1983] bank run problem.

In this paper, we test empirically the value of lender coordination, relying on a unique data set that contains detailed credit file information sampled from distressed clients of six leading German banks. It contains a comprehensive array of lending-related data on medium-sized corporates that were in distress at least once during the period 1992-1997. The basic objective of our study will be to explore how banks behave in the event of a corporate distress. The major questions asked are: "Do banks systematically coordinate their interests, and if so, how is lender coordination achieved? Second, and most importantly, what real economic consequences are associated with lender coordination, and what are its major determinants? Finally, is the success of a workout predictable, and if so, which determinants matter?". We find that over the past decades the banking industry in Germany has developed a widely accepted and fine-tuned contractual arrangement that harmonizes lender interests in the event of borrower distress. This unification of interests is achieved by forming a so-called "bank pool". Our data set allows us to identify when these pools are formed and what impact they exert on workout, in particular, on workout success. We will argue that the sustainability of the institution bank pool is closely related to the structure of the insolvency code, with significant differences between the German code and the US code (Chapter 11).

The main empirical results of this study suggest that multiple lending is widespread among medium-sized firms in Germany, and that explicit coordination among these lenders starting at the onset of financial distress is very common. Coordination is typically achieved through the formation of bank pools. These pools aim at the reorganization of the common distressed borrower. Bank pools with few member banks significantly increase the likelihood of a successful turnaround during a reorganization process, whereas pools with many member banks tend to decrease turnaround probability, extending the time needed to resolve distress. The formation of the pool itself depends on the severity of the initial distress shock, the number of firm's bank relationships and their heterogeneity in terms of debt outstanding.

We will proceed as follows. Section 2 gives a brief account of the relevant theoretical and empirical literature and motivates our special interest in the question of lender coordination. Section 3 lays out the institutional details of the bank pool and discusses the typical contract design. Section 4 states our major hypotheses. Section 5 describes the data set in some detail, including the clients' debt structure and the occurrence and structure of bank pools. Section 6 derives the main results. Section 7 discusses our findings, relating them to the structure of the insolvency code.

2 Review of the literature

Under complete contracting, the standard theory of debt leaves no room for the renegotiation of contracts. In contrast, if contracts are incomplete owing to unverifiable information, contracts may be renegotiated. In these incomplete contracting models, information is typically assumed to be observable to both parties, the lender and the borrower, while it is unobservable to third parties. Lenders face difficulties enforcing their claims in court. Borrowers, on the other side, cannot easily switch to other lenders since outsiders do not, or only at cost, observe return realizations. This leads to two types of moral hazard problems, namely strategic default and hold up. The former describes the incentive to default strategically by repudiating debt payments despite project returns being sufficiently high. The second refers to the lender exploiting his informational monopoly acquired over time, and charging above the fair rate in later periods.

The borrower's incentive to default strategically and renegotiate terms of the debt contract is analyzed by Hart and Moore [1998] in a model of a single-lending relationship and exogenous division of the parties' bargaining power in renegotiation. From different theoretical modelling approaches it has become the common perception that the moral hazard risk of strategic default, which may lead to an underinvestment problem, can be overcome by multiple lending relationships which represent debt that is harder to renegotiate, or even non-renegotiable. Bergman and Callen [1991] accredit public debt, seen as non-renegotiable due to free-rider problems, as an effective self-binding commitment device of the firm not to default strategically. However, even if the firm is able to renegotiate with multiple lenders, Bolton and Scharfstein [1996] and Bergloef, Roland and von Thadden [2000] demonstrate in different ways that the increased bargaining power of multiple lenders in renegotiation lets strategic default look less attractive to the firm.

Besides the deterrence of strategic default, multiple lending relationships are also a powerful instrument for avoiding the second source of moral hazard, namely hold up. Rajan [1992] addresses the issue of hold up and demonstrates in his model that the value of financial flexibility provided by a relationship lender has to be weighted against the monopoly bargaining power of the single lender derived from its monitoring function.

It is obvious that multiple lending can also impede renegotiation when it is actually efficiency-enhancing. All the papers enumerated so far recognize that the benefits of multiple lending come at a cost and one has to find a trade off. The common source of the cost in all models is a state of low return realization in which the firm is not able to meet its contractual repayment obligations. Hence, the so-called liquidity default is inevitable. Inefficiencies arise from the inability to renegotiate multiple debt, higher cost of renegotiation, or reduced expected liquidation values. Rajan [1992] and Bergman and Callen [1991] argue that inefficiencies in liquidity default stem from free-rider problems. An increase in the number of lenders lowers the probability that a single lender is pivotal in renegotiation. Hence, especially small lenders have an incentive to free ride. In the two-period model of Bolton and Scharfstein [1996], debt will not be renegotiated in liquidity default situations. Here the firm cannot credibly commit to repay debt out of future returns due to the unverifiable nature of returns. However, multiple lenders render liquidation of assets more difficult, too. Modelling liquidation as a bargaining game between lenders and an outside investor, the increased bargaining power of multiple lenders deters outside investors. Although the lenders' payoff from bargaining is increasing in the number of lenders, the probability that an outside investor actually enters into the bargaining process is decreasing, and so is the expected liquidation payoff received by lenders.

In a second group of papers, it is argued that the major problem associated with multiple lending is due to bargaining problems among lenders rather than between lenders and a common borrower. The common pool or collective action problem addresses the risk of coordination failure. Although renegotiation is in the collective interest of all creditors, individually they may find pre-emptive debt collection favorable. They will tend to foreclose on their loans in fear of similar actions by other lenders although the firm's prospects may in fact be sound. Underinvestment will be the consequence. Multiple self-fulfilling equilibria arise, which resemble a bank run as modelled by Diamond and Dybvig [1983]. Morris and Shin [1999] apply the idea of coordination risk to corporate debt and its pricing. A number of papers including Brown [1989], Bebchuk and Chang [1992], Schwartz [1997], and Longhofer and Peters [1999] discuss how the risk of coordination failure can be overcome by the implementation of optimal bankruptcy procedures.

It is thus an important question whether, first, lender coordination can equally successfully be reached through informal, private arrangements and, second, what are the institutional prerequisites for this to happen. Bolton and Scharfstein [1996] demonstrate that a majority voting rule imposed on creditor decisions will support coordination. It will constrain creditor bargaining power and increase expected liquidation payoff. The occurrence of bank pools as a common instrument in German corporate lending demonstrates that lender coordination can be reached outside court supervision. It thereby substitutes for a formal, court-supervised reorganization procedure which was lacking under the former German bankruptcy code ("Konkursordnung"), in force until end of 1998. As an institutional prerequisite we can identify a complimentary element of the insolvency code, the unconditional status of privately agreed seniority rights. Uncontestable seniority is absent from the US bankruptcy code, which might explain why we do not find the same degree of bank involvement in private workouts when comparing Germany and the US.

To date, the papers providing empirical results on the topic build exclusively on US data. They compare formal procedures under Chapter 11 of the US Bankruptcy Reform Act with informal, private reorganizations of distressed firms. Gilson, John and Lang [1990] study the characteristics of 169 financially distressed US firms. About half of these firms have restructured their outstanding debt privately, while the other half sought protection under Chapter 11. Their findings suggest that firms are more likely to restructure privately when they have more intangible assets, a relatively high going-concern value, and owe more to banks and to fewer lenders. Franks and Torous 1994 compare private restructuring, organized as an exchange offer, with Chapter 11 reorganizations. Their analysis shows that recovery rates are on average higher in private restructuring. Deviations from absolute priority are more likely in private restructuring. In contrast to the results of Franks and Torous [1994], Gilson [1997] finds transaction costs of private restructuring to be relatively high compared to Chapter 11 reorganizations. The author's reasoning on low transaction costs under Chapter 11 includes majority voting, compared to unanimity requirements out of court, and reduced information asymmetries between the firm and its investors. Moreover, Chapter 11 offers more flexibility in choosing a new capital structure, whereas leverage remains high in a private workout. Asquith, Gertner and Scharfstein [1994] analyze distressed issuers of high-yield junk bonds. They find that banks restructure out-of-court by either loosening financial constraints, e.g. deferring principal or interest and/or providing fresh money, or by tightening, e.g. reducing credit lines and/or increasing collateral. However, the bank's willingness to make concessions is limited, even more so when the bank's debt is secured, since public creditors participate in the gains of restructuring.

Our own empirical analysis in this paper studies private reorganizations and the coordination among creditors in a creditor-friendly legal environment. The analysis is related to Gilson, John, and Lang [1990]. Like them, we analyze a sample of financially distressed firms, and we identify explanatory variables for the incidence of lender coordination and for the success of private workouts. Unlike them, however, we concentrate on private rather than public debt restructuring under the German bankruptcy code. In contrast to the US code, private contractual arrangements in Germany remain uncontested even when formal court proceedings are under way. For our study, we use first-hand credit-file data of banks involved in the restructuring of distressed borrowers. Furthermore, we explicitly address the question of lender coordination, or the failure thereof, and relate it to the special features of the German insolvency code.

3 The microstructure of bank pools

While collecting our data set, we became aware of an institutional arrangement that serves the purpose of coordinating lender decision-making in the event of a borrower distress. The so called "bank pools" are formal contractual arrangements in which a group of bank lenders pool their individual claims vis-à-vis a particular borrower. These pools appear to be widely used in German banking, but they are little known outside banking circles and have not yet been analyzed by economists. The basic institutional features of these pools will be described in this section, descriptive statistics will follow in section 5.

The standard pool contract has been used throughout the last thirty years. Its special format is adapted to the needs of distress situations, which are relevant for our data set. Core elements of the standard pool contract are as follows:

- a list of contracting parties and outstanding loans,
- a description of pool leader responsibilities, including the administration of collateral;
- an agreement as to the joint and mutual settlement of credit account balances between participating banks;
- an agreement as to the distribution of revenues from liquidation or ongoing client business;
- a sharing rule concerning the costs of running the pool;
- a sharing arrangement concerning relevant default information, and
- an agreement as to the duration of the contract, and exit rules.

An abbreviated English version of the standard pool contract is in Appendix 1 [see Scholz and Lwowski 1994, and Hellner and Steuer 2001 for a complete German text].

The pool contract establishes a binding commitment for every bank to coordinate its client-related actions with all other pool banks. Most importantly, each bank commits itself to keep its credit line open and to refrain from any line reduction. Thus, the seizure of collateral or any forced repayment is ruled out, unless the pool members decide unanimously to the contrary. In general, revenues from client's ongoing business, or from the realization of collateral are shared among pool banks in proportion to their relevant credit balances. If banks learn individually about circumstances that endanger the repayment of debt, information has to be shared among all pool banks and, therefore, the otherwise rigid rule of bank secrecy is lifted.

From field interviews, supported by our data, we know that only uncollateralized junior loans are pooled. Collateralized creditors' participation in the pool corresponds to the uncollateralized portion of their debt. Thus, junior lenders will bear the burden of a workout since fresh money is typically provided by the pool according to pre-specified pool quotas. This scenario has been observed throughout decades since bank pools were established. It is important to mention that this scenario does not at all imply that senior banks, notably collateralized housebanks, are left out of pool negotiations altogether. The reason is that even housebanks typically have part of their loans unsecured. Furthermore, banks have an informal stand-still agreement regarding the collateralized (non-pooled portion) of their debt which, although not contractually binding, is apparently sufficient to prevent preemptive action by these parties. Once a pool exists, additional attempts are made to collateralize new and outstanding junior pool loans. This explains the existence of collateralized pool loans.

4 Hypotheses on bank pools and reorganization

The strands of the literature reviewed in the preceding sections have made clear that renegotiation of loans is a function of the number of lenders. Bolton and Scharfstein [1996] and Rajan [1992], among others, view multiple lending as a commitment device not to renegotiate. This is efficiency-enhancing if strategic default can be avoided. On the other hand, inefficiencies from multiple lending arise in liquidity default states, since renegotiation or liquidation becomes more expensive when multiple lenders are involved.

A second argument is put forward by Morris and Shin [1999]. With many lenders, successful renegotiation requires coordination among lenders. In particular, it requires a commitment to continue the financial relationship with a financially distressed but economically sound firm. The risk of preemptive termination of loans and the early seizure of collateral may lead to an inefficient outcome here.

We view bank pools as coordination devices that attempt to align the incentives of multiple lenders when their common debtor is in distress. In order to understand the economics behind this contractual institution, we will model the pool formation decision first, and its impact on the success of reorganization afterwards.

4.1 Determinants of pool formation

Pool formation is assumed to depend on three key factors, namely the number of bank relationships maintained by a single (distressed) borrower, the importance of the free-riding incentive within the group of lenders, and the severity of the distress event. These factors are explained in turn.

4.1.1 Number of bank relationships

First, following Bolton and Scharfstein [1996] and Rajan [1992], the number of lenders will influence the likelihood of pool formation. Disregarding any costs, the larger the number of lenders, the higher the value of a bank pool in distress. Thus, a large number of banks should increase banks' incentive to form a pool. However, balancing of costs and benefits of multiple lending may explain a negative impact of a large number of bank relationships on the probability of pool formation.

4.1.2 Distribution of lending shares among lenders

Second, workout activities are of a public good nature. They entail private costs, while possible benefits are shared among all lenders, irrespective of their involvement in the reorganization. We postulate that free-riding incentives become large when the lending share of one creditor is significantly bigger than the shares of all other creditors. Small lenders will free-ride by refusing to participate in a pool and relying on the large lender's incentive to attempt workout individually. Thus, the more heterogeneous the distribution of lending shares, the lower is the probability of pool formation.

4.1.3 Severity of the distress shock

Third, the severity of the distress shock should be positively related to the probability of pool formation, since only strong shocks will unambiguously be interpreted as signals of distress by all lenders. And it is only in situations of fundamental distress that pooling of interest is warranted because, as was made clear by Bolton and Scharfstein [1996], renegotiations between the firm and a pool of lenders decreases a single pool bank's bargaining power in strategic default situations. Thus, if the rating which defines the onset of the distress period (i.e. the first negative rating for a given borrower during our observation window) is a 6, the worst rating notch, rather than a 5, the formation of a pool should be easier. The reason is that it should be easier for any given lender to convince all remaining banks of the necessity to form a pool if the economic situation as described by the rating has markedly worsened. In a univariate sense, the initial distress rating (i.e. 5 or 6) is expected to be positively related to the probability of pool formation.

4.1.4 Control variables

Borrower size Given that a bank pool involves coordination costs, the banks' decision on pool formation also depends on the size of the borrower. We measure size in terms of firm's total assets. Total assets should have an impact on expected future revenues out of which banks' costs will have to be reimbursed. We therefore hypothesize that firm size is positively related to the probability of pool formation. Furthermore, including borrower size enables us to control for the possibility that also the number of banks proxies size rather than coordination issues.

Housebank and collateralization The housebank is not likely to be a driving force in forming a bank pool. Given its senior position in terms of collateral, as was shown by Elsas and Krahnen [2000], and given its superior information status, the housebank stands to lose less than the other banks from an inefficient liquidation of firm's assets due to coordination failure. Note that the housebank status and the degree of collateralization are mutually reinforcing factors in this regard. Both variables will be included in the regression.

Bank identity Finally, there may well be systematic differences between banks in our sample with respect to their willingness to engage in a bank pool. Recall that the banks in our sample comprise the biggest banks from all three German banking sectors, namely private banks, savings banks (mostly owned by communities), and cooperative banks. Thus, policy differences between institutions may well play a role here.

4.2 Determinants of workout success

4.2.1 Bank pool

Once a bank pool is established, participants are committed to the coordination of behavior amongst all pool members. According to Morris and Shin [1999], the risk of coordination failure is then banished. Coordination among lenders in the sense of Bergman and Callen [1991] also prevents free-riding, which could otherwise block reorganization. Following Bergloef et al. [2000] and Bolton and Scharfstein [1996], high reorganization costs of multiple lenders can be reduced when lenders coordinate and commit themselves via, e.g. specific voting procedures. Summarizing the above arguments, the existence of a bank pool should render the success of reorganization more likely.

4.2.2 Number of bank relationships

Due to free-rider problems, the probability of successful renegotiation of debt in a distress situation is expected to be negatively related to the number of lenders [see Bergman and Callen 1991, and Hege 1997]. This is caused by the low probability of each individual lender being pivotal for the firm's failure. We thus hypothesize that a larger number of bank relationships decreases the probability of workout success.

Given that a bank pool is formed, the number of extant bank relationships may serve as a proxy for pool size. However, there are conflicting bargaining incentives among the different financiers of a distressed firm. Our a-priori belief is that bargaining costs are directly proportional to the number of banks in a pool. The main reason for this belief lies in the incentive of small creditors to deny concessions, or in general to be less actively involved in a restructuring process and, therefore, to be less committed to timely action. In comparison to pools with a small number of members, "large" pools are expected to need more time for decision-making. Stretching a workout over time may be costly in terms of opportunity costs as well as in terms of options foregone. Furthermore, since "large" pools are less prepared to act flexibly, they are likely to liquidate distressed firms more often than "small" pools. In this regard, "large" pools bear some similarity to a group of bondholders.

4.2.3 Housebank status

While we have a clear prediction for the effect of a bank pool on workout success, we have no such hypothesis for the housebank relationship. There are counteracting effects to consider. On the one hand, a better informed housebank may be able to implement the timing and the sequencing of workout decisions more efficiently. By the same token, it is more likely to get the menu of actions right, given its intimate knowledge of the borrower's history. On the other hand, once distress has become public, every lender will collect more information about the borrower in order to prepare a possible workout. In particular, if a bank pool has been formed, the informational advantage of the housebank is shared by the pool. For all these reasons the unique position held by a housebank in normal times is likely to be weakened in distress periods. We therefore do not expect the housebank variable to have considerable explanatory power with respect to workout success.

5 The CFS Distressed Loan Data Set

5.1 General characteristics of the data set

This study relies on the CFS Loan Data Set, collected under the Center for Financial Studies' field research project on Credit Management [see Elsas et al. 1998 for a detailed description]. The data underlying our analysis include distressed and potentially distressed corporate debtors of the following six major German banks: Deutsche Bank, Dresdner Bank, Commerzbank, Bayerische Vereinsbank (now HypoVereinsbank), DG-Bank (Deutsche Genossenschaftsbank, now DZ-Bank), and WestLB (Westdeutsche Landesbank). The unit of observation is a particular firm or, more specifically, a particular bank-firm relationship, using all information regarding the firm contained in the credit files of a bank. The data set contains in particular

- general characteristics of the borrowing firm (e.g. legal form, industry);
- a time series of firm's balance sheet data (up to 7 years);
- an assessment of borrower risk, according to the bank's internal risk rating;
- a complete account of all outstanding loans from the respective bank, including data on loan terms, e.g. volume, maturity, collateral, spread;
- general information concerning other bank relationships, including the existence of a bank pool;
- a complete time-stamped list of measures taken by the bank in order to reorganize or liquidate the firm, or its assets.

This information was collected directly from the banks' credit files. Observations range from 1991 up to 1999. The sample was randomly drawn from a population of all corporate customers who met the following set of conditions at least once during 1992-1997, where borrowers whose relationship started after 1992, or was terminated before 1997, are included.

- First, companies had to be medium-sized, i.e. with an annual turnover between DM 50-500m (EUR 25-250m). Due to the absence of surveillance by rating agencies and the lack of rigorous disclosure requirements, we expected this company size segment to be subject to a significant degree of asymmetric information between lenders and borrowers, thus constituting a prime population for the analysis of issues related to relationship lending, loan contract design, and renegotiation.

- Second, to ensure a minimum level of information regarding the clients' total bank debt and the number of the borrower's bank relationships, a minimum total loan size of DM 3m (EUR 1.5m) was imposed. All loans surpassing DM 3m are subject to the regulatory notification requirement of Article 14 of the KWG (German Banking Act), and have to be communicated to the federal banking supervisory agency (BAKred).

- Third, clients with registered offices in the former GDR (East Germany) were excluded.

- Fourth, to generate a sample of potentially distressed borrowers, a random selection was chosen from the set of firms that had recorded a poor internal credit rating at least once within the 1992-1997 period. The rating reflects the expected default probability of the firm, as seen by the bank, before collateralization is taken into account[1]. A poor rating is defined as a rating of 5 or 6 on a standardized rating scale ranging from 1 (highest grade) to 6 (lowest grade) for all banks in this sample. Rating categories 5 and 6 indicate that banks expect the borrower to be problematic, i.e. potentially distressed, or distressed. The standardization process is described in section 5.4.

The generated sample includes 124 borrowers and a total number of year-end observations[2] of 597. Table 1 shows the frequencies of credit files collected from each bank.

Grouped according to industry sectors, Table 2 shows that the majority of firms come from the engineering (33) and manufacturing (30) sectors. The

[1] Internal ratings are typically derived from scoring models that measure firm risk. Furthermore, adjustments for collateralization are commonly made, though we rely on raw ratings only.

[2] When there is more than one observation per year we only consider the last observation. However, we cumulate the information on distress measures taken by the bank over all observations in the respective year.

Bank[3]	1	2	3	4	5	6	total
Frequency	16	30	14	16	28	20	124

Table 1: Number of observed borrowers per bank

third largest sector is trade, including both retail and wholesale, with a total of 17 firms in our data set. Other sectors are of rather minor importance in this sample.

industry sector	no. of sample firms
engineering	33
manufacturing	30
trade[4]	17
construction	9
transportation	5
services	4
energy	4
others	22
total	124

Table 2: Sample firms by industry sectors

5.2 Firm size and debt structure

The major sample selection criterion refers to company size, proxied by annual sales, representing medium-sized companies. Annual sales had to be larger than DM 50m and smaller than DM 500m (EUR 25 – 250m). In our sample of 124 problematic and distressed firms, the average company size is DM 144.3m (EUR 72m), with a median of DM 104.1m. For this size class, German firms typically have not issued any public debt instruments. The average debt-to-assets ratio is 70.82%, the bank-debt to total-debt ratio is 75.57%. The remainder comprises other forms of debt, e.g. trade credit and debt given by owners. The fraction of bank debt in total debt is considerably larger than the ratio in a comparable representative sample, where the average bank debt is about 50% of total debt. With respect to the number of bank relationships, however, there is no significant difference between these samples[5]. As can be seen from Table 3, firms tend to borrow from several banks, with a mean value of 6 and a median of 5 (with a minimum of 1 and a maximum of 30).

	mean	median	std.dev.
annual turnover (m DM) ($n = 121$)	144.3	104.1	139.3
total assets (m DM) ($n = 121$)	121.2	69.1	155.9
total debt (m DM) ($n = 121$)	73.1	47.0	86.4
total bank debt (m DM) ($n = 109$)	61.7	36.6	77.8
debt-to-assets ratio ($n = 121$)	.7082	.7115	.2261
banks' debt share ($n = 107$)	.7557	.8122	.2532
number of banks ($n = 123$)	6.0	5.0	4.3

Table 3: Descriptive statistics on firm size and debt structure

Additionally, we analyzed whether larger borrowers tend to have more bank relationships and higher amounts of debt outstanding per bank. The results, comprised in Table 4, suggest that both total bank debt and the average debt per bank increase in firm size as measured by either total assets or annual turnover. The relationship between firm size and the number of banks lending to the firm is positive as well, albeit with a smaller correlation coefficient.

	no. of banks	total bank debt	∅ debt per bank
total assets	$.336^*_{(n=120)}$	$.832^*_{(n=107)}$	$.680^*_{(n=107)}$
annual turnover	$.422^*_{(n=120)}$	$.767^*_{(n=107)}$	$.581^*_{(n=107)}$

Table 4: Bivariate correlation between firm size and size of bank debt
* p=0.01 level of significance (two-tailed).

5.3 The identification of housebanks

The housebank variable is assigned a value of one whenever decisions taken by the bank in question were explained, in the credit files, using arguments

[5] See Elsas and Krahnen [2000],and Machauer and Weber [1998] for descriptive statistics relating to the representative sample.

explicitly relating to its housebank status (e.g. "we are the housebank", "we are the main bank", "we have a special responsibility", etc.), zero otherwise. The resulting housebank attribution thus differs substantially from other measures of relationship intensity used in the literature, such as duration or the number of bank lenders. We believe our attribution to be a more reliable indicator, since it is directly based on the internal judgment of one of the parties to the implicit contract. The sample of problematic or distressed borrowers used in this study contains 45 housebank relationships and 79 non-housebank relationships. In Table 5, the number of bank relationships is related to the housebank attribution.

		housebank		
		0	1	total
#banks	1	0	7	7
	2 − 3	9	19	28
	4 − 7	46	14	60
	8+	23	5	28
	total	78	45	123
	(missing)	(1)	(0)	(1)
	mean	7.038	4.224	6.016

Table 5: Cross-table of housebank attribution and the number of banks

The mean number of bank relationships is significantly higher in the case of normal bank relationships than in the case of housebanks. About 77% of all housebank relationships have at most 3 banks, while for normal relationships this fraction is only 11.5%. Of course, it is likely that in a given normal bank relationship there is a different bank acting as the relevant housebank, although the probability may be smaller than one. Of course, the probability to observe a housebank in our sample is decreasing in the number of bank relationships.

5.4 Internal ratings

An important characteristic of our data set concerns internal ratings of lending institutions, since for none of the firms in our sample do we have evidence of external ratings from agencies such as Dunn&Bradstreet. The rating information has been collected on every borrower and for each observation recorded in the files. Each bank in our sample uses its own rating system in order to assess the probability of default by its borrowers at regular intervals, i.e. every two years for high-graded firms and at least once a year for firms of medium and low quality, and whenever information crucial to the firm's creditworthiness is revealed. Low-quality firms are commonly observed to be rated even more frequently.

The standard methodology of the rating process relies on a scoring system with up to five different main criteria, including quantitative and qualitative information about firm performance and prospects, and a linear weighting system with both fixed and varying weighting factors depending on the bank in question [see Brunner, Krahnen, and Weber 2000 for details].

Ratings are believed to reflect expected default probabilities, as seen by the banks, as an unbiased estimate. As long as internal ratings remain the private information of the bank, i.e. as long as rating information is not communicated to either the management of the rated firm, or to some supervisory body, there is no inherent incentive for the bank to misrepresent the information available systematically. Internal ratings are thus expected to be informationally efficient [see Krahnen and Weber 2001].

In the subsequent empirical analysis we assume internal ratings to be efficient and unbiased. The ratings of different banks representing different rating scales have been standardized in a transformed rating scale with six rating categories, in which grades 5 and 6 describe borrowers that are either potentially distressed (problematic), or actually distressed. The standardization process is based on the bank-individual rating categories and their verbal descriptions taken from the banks' rating manuals guiding credit officers when to assign a firm to a certain rating category. Using these descriptions each category of a bank-individual rating system was assigned to one of the six new categories of the standardized system [see Table 15 in Appendix 2]. Figure 2 in Appendix 2 shows the frequency distributions of client ratings of the five banks on the standardized rating scale for a representative sample of 1996 data ($n = 101$). Obviously, the frequency distributions of ratings across the banks appear to be similar, although Bank 2 seems to have clients with better internal ratings on average[6]. Bank-specific credit policies may be responsible for this observation, rather than an incorrect calibration of the rating scale. In particular, two banks may assign identical ratings to the same client, but differ w.r.t. the average internal rating of their client pools due to different lending policies. In the case of Bank 2, for example, credit officers were explicitly instructed to minimize the number of low-rated

[6] Based on a χ^2-homogeneity test applied to the frequency distributions of banks 1,3,4,5 we cannot reject the hypothesis that all ratings come from the same distribution. Adding the internal ratings of bank 2 leads to a rejection of this hypothesis.

customers. Other banks maintain close relationships with their clients and rather adjust prices in order to make up for the increase in default risk.

5.5 Credit Event

The time when a borrower's internal rating is downgraded by the bank to a standardized rating class of 5 or 6 for the first time in our data set is labeled the credit event. The credit event thus describes the onset of financial distress. For some of the banks in our sample, the credit event corresponds with the time when competence for a certain client is transferred from the local credit authority to the workout group on the regional level (other banks may not have implemented such workout groups). The workout group has specific expertise regarding the reorganization, and also liquidation, of borrowers. At the onset of financial distress, the event rating, which can either be rating class 5 or 6, also measures the severity of the distress shock. In our sample, we find 101 rating downgrades to rating 5 and 23 rating downgrades to rating 6 where the latter may also include cases in which liquidation starts right away.

5.6 Bank behavior in distress

The onset of financial distress measured by the credit event typically goes along with the bank adjusting its behavior vis-à-vis the firm to the new information. Bank measures in a distress situation may include:

- *loosening* the firm's financial constraints by postponing due repayments and interest payments or even providing additional funds (fresh money) to help the firm overcome a liquidity shortage.
- *tightening* the firm's financial constraints by reducing credit lines, terminating individual loans or requiring additional collateral in order to discipline the firm's management.

However, loosening and tightening measures are not necessarily mutually exclusive. The bank may, for example, provide fresh money and require additional collateral at the same time. Additionally, the bank reacts to declining borrower quality in ways not directly related to the size and structure of loan agreements, for instance by increasing its monitoring. The term 'workout' is commonly used to describe the bank's effort to carry on the lending relationship to a distressed or potentially distressed borrower. It may include the postponement of repayments due, fresh money, reorganization plans, and advisory services.

As argued in previous sections, the bank pool can be seen as a coordinating device, facilitating the reorganization of distressed firms. In 7 cases (out of 101 in the data set), distressed firms are immediately liquidated, two of which using formal bankruptcy proceedings. In 11 additional cases, the firm is liquidated after attempts to reorganize it had failed. Thus, there are 18 liquidations altogether in sample, 6 of which filed for bankruptcy.

5.6.1 Collateralization

Collateralization of outstanding loans is relevant information once a lender has to decide how to behave in distress situations since it considerably affects the payout scheme. Furthermore, collateralization plays an important role in setting up a bank pool which comprises only unsecured loans. In our distress sample, the share of loans collateralized when distress occurs amounts to 45.42% on average[7] [see Table 6] and is therefore higher than collateralization of assets in a representative sample[8].

	collateralization ($n = 74$)		
	$t-1$	t	$t+1$
mean	38.28	45.42	41.54
median	34.97	40.80	38.80
min	0.00	0.00	0.00
max	100.00	100.00	100.00
std.dev.	31.68	32.73	30.81

Table 6: Collateralization around the distress event

In addition, collateralization at distress event is higher than in the periods before and after the event. However, changes in collateralization can be explained by three factors: a re-evaluation of collateral assets, the acquisition of additional assets, or a change in loan volume. Table 7 concentrates on the value of collateral assets around the distress event thereby eliminating the

[7] The table comprises all cases out of 124 for which data on collateral is available for at least one period ahead of and one period subsequent to the distress event.

[8] In 1996, the average collateralization of loans in a representative sample of 98 firms was 31.5%. See Elsas and Krahnen [2000] for further details.

influence of changes in outstanding bank debt. It reveals that collateral value is slightly increasing around the distress event which suggests that banks acquire additional collateral when borrower quality is declining. Thus, the decrease in collateralization of about 4 percentage points in the distress event can not be explained by a devaluation of collateral. Instead, banks seem to hand out fresh money without getting the proportional amount of collateral assets in return. However, one has to keep in mind that the data is highly aggregated and the reliability of these conjectures therefore is weak.

	collateral value ($n = 62$)[9]		
	$t-1$	t	$t+1$
mean	93.54	100.00	100.82
median	100.00	100.00	95.48
min	0.00	100.00	0.00
max	250.00	100.00	618.81
std.dev.	57.03	0.00	84.13

Table 7: Collateral value around the distress event

5.7 Bank pool

Among the 124 firms in the sample which are distressed or potentially distressed for at least some interval of our observation window, there are 58 credit relationships involving pool arrangements. In line with the hypothesis that a poor initial distress rating enhances pool formation, Table 8 indicates

that a poor initial distress rating (notch 6) leads to pool formation in 70% of all cases, while a mild initial distress rating (notch 5) is accompanied by pool formation in only 40% of all cases.

However, bank behavior differs with regard to individual bank's participation in pools. Table 9 indicates that for 4 out of 6 banks (namely those numbered 1, 2, 4, 6) participation in a bank pool can be observed in about 50% of all cases. Note that Bank 3 has considerably more pool relationships, and Bank 5 has considerably less. Thus, in regression analysis it will be necessary to control for the identity of the bank.

The number of housebanks observed in our sample which are also members of a bank pool is less than proportional. Of the 58 bank pools we

		event rating		
		5	6	total
pool	0	59	7	66
	1	42	16	58
	total	101	23	124

Table 8: Cross-table of creditor pool and event rating

		bank						
		1	2	3	4	5	6	total
pool	0	8	16	2	8	22	10	66
	1	8	14	12	8	6	10	58
	total	16	30	14	16	28	20	124

Table 9: Cross-table of creditor pools and bank identity

observe, only 15 housebanks were involved, as far as we could observe. However, care must be exercised when interpreting this fact. There are 6 cases in our sample where the housebank is the one and only lending institution. Furthermore, even if the bank we observe is not a housebank but engaged in a bank pool, another member bank might be a housebank for the borrower in question.

The number of banks involved in a pool contract is a potentially relevant piece of information. In the literature, it is frequently argued that the higher the number of creditors, the more difficult it will be to achieve coordination. We do not have complete information about the structure of the bank pool, with respect to its size and the identity of its member banks and their relative pool shares. However, we do know the total number of lending relationships. This number will be used as a proxy for the number of pool banks. Recall that the purpose of pool negotiations is to integrate all banks with active lending relationships.

Figure 1 relates the incidence of bank pools to the number of bank relationships. It shows that the fraction of pool contracts is highest when the number of bank relationships is between 4 and 7. This is consistent with the view that coordination problems are increasing in the number of creditors, thereby increasing the value of these pools. However, pools may be more difficult to establish when the number of banks is large.

Although we could not record the size and the composition of bank pools for all relationships in our sample, we do have these data for one particular

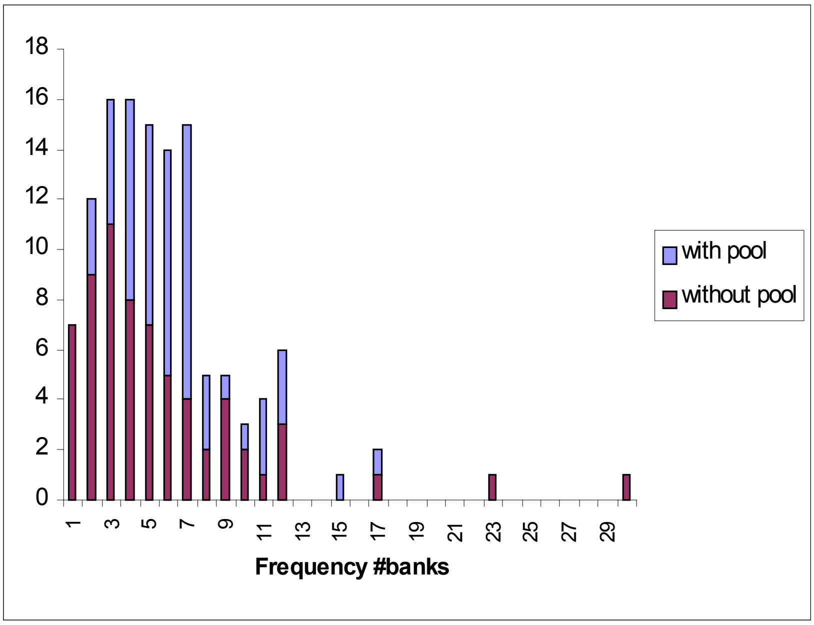

Figure 1: The frequencies of pool and non-pool cases as a function of the number of bank relationships (n=123)

institution, Bank 6. Table 10 will give the reader a first indication about the bank's role across different pools.

It is obvious from these numbers that neither is all outstanding debt included in the pool, nor does the bank necessarily participate in the pool with a share equivalent to its share in total bank debt. For firms $6-9$ the bank's share in the pool is considerably larger than its fraction of total bank debt, while it is smaller for firm 5. The fraction of total bank debt covered by the pool varies between 12% and 44%. These numbers support the results of our field interviews, i.e. outstanding bank debt is only partially pooled.

Additional evidence comes from the 18 liquidations in the sample of 124 distressed firms. While there are no pools among the cases that were immediately liquidated, there were pools at work in 9 out of 11 cases where reorganization efforts eventually failed, and firms were liquidated. Thus, bank pools seemingly aim at reorganization, but are not always successful.

$firm$	$\#banks$	$\frac{bankdebt_6}{\sum_i bankdebt_i}$	$\frac{pooldebt_6}{\sum_i pooldebt_i}$	$\frac{pooldebt_6}{bankdebt_6}$	$\frac{\sum_i pooldebt_i}{\sum_i bankdebt_i}$
1	7	.	.25	.67	.
2	6	.	.26	.16	.
3	6	.26	.26	.16	.16
4	6	.	.23	.21	.
5	5	.19	.09	.06	.12
6	6	.15	.20	.25	.19
7	3	.36	.50	.22	.16
8	4	.44	.50	.51	.44
9	5	.15	.34	.93	.41

Table 10: Pool structure of Bank 6's clients one period after the credit event

6 Estimation methodology and results

6.1 Methodology

After a brief description of the estimation procedures used in this study, we will discuss the results of testing our hypotheses on pool formation, and will then turn to workout success. Both regressions use cross-sectional data. The regression on pool formation is a standard probit. The underlying latent dependent variable is the probability of pool formation and the variable actually observed is binary representing either 'pool formation' or 'no pool formation' within our observation window. The set of explanatory variables include both quantitative variables and qualitative dummy variables.[10]

The workout success regression is divided into three parts. The first part consists of a probit regression similar in methodology to that applied to pool formation. Here the latent dependent variable is the probability of workout success for which we observe realizations of a binomial process 'success' or 'no success' where the latter includes both failures and unresolved cases. The set of explanatory variables again include qualitative and quantitative variables. However, we now face the possibility of an endogeneity problem. The endogeneity problem arises from the fact that the existence of a pool which is shown to be endogenous in the very first regression, is among the explanatory variables hypothesized to have an impact on the probability of workout success. Error terms in both regression equations may be correlated which we control for in the second part by using a two-stage estimation pro-

[10]For a variable description see Table 16 in Appendix 3.

cedure suggested by Maddala [1983]. The model we are estimating is similar to Maddala's model 5 with mixed structure where both the latent variables and their qualitative realizations enter into the model. In the third part we use the time spent in distress as an alternative measure of workout success, in contrast to the binary dependent variable of 'success' or 'no success' used before. Accordingly, the estimation method used is a duration analysis where the dependent variable is the time the client spends in distress.

6.2 Determinants of pool formation

The following regression analysis will help us understand the determinants of pool formation. The sample used here consists of 101 observations where we excluded relationships which we do not observe after the distress event[11]. Firms with single bank relationships are included in the sample since there is positive probability of pools formed by one bank and non-bank creditors. The dependent variable is the POOL-dummy variable, equal to one if a bank pool has been formed and zero otherwise. The set of explanatory variables in model specification $(1.i)$ comprise the log of the number of banks, log (#BANKS), as potential pool members. The SKEWNESS-variable proxies for relative size of lender claims or, in other words, the heterogeneity of banks' lending shares. SKEWNESS is small when the bank's lending share roughly equals the average share, i.e. one divided by #BANKS, and it increases if the bank lends more or less than this.[12]

$$SKEWNESS = \left| \frac{BANK'S\ DEBT}{TOTAL\ BANK\ DEBT} - \frac{1}{\#BANKS} \right|$$

RATING6 measures the severity of the initial distress shock by assigning a value of 1 to all observations with a very poor initial distress rating (notch 6), and zero otherwise (notch 5). We include the housebank dummy HB in

[11] There are 23 firms for which the distress event occurred in the last period of observation. The number of observations increased compared to an earlier version of the paper. In contrast, when an observation is missing by the time of the distress event, e.g. the number of bank relationships, we here use the closest observation as the best proxy.

[12] Compared to an earlier version of the paper, we redefined the SKEWNESS variable in the sense that we use for both the observed bank as well as all banks the amount of debt actually withdrawn by the firm instead of the credit lines available. The reason is that information on other banks' credit lines are not always available whereas data on exposures are collected by the supervisory agency BAKred and aggregated data is distributed to all lending banks in return.

our regression. HB is assigned the value 1 if the bank is a housebank to the respective client and zero otherwise. The variable COLLATERAL measures the collateralized portion of the bank's loans with the client. The identity of each of the six banks is included in the variables BANK1, BANK3, ..., BANK6 (Bank 2 serves as the reference group here). The variable LOG(ASSETS) measures firm size which is included in model specification (1.*ii*). We included two industry dummies controlling for the ENGINEERING and the MANUFACTURING sector and, finally, two so-called TIME2END-dummies controlling for the number of periods observed after the distress event, i.e. the time span between the credit event and the end of the observation window. The results of the probit analysis are shown in Table 11.

$$POOL = f\begin{pmatrix} \log(\#BANKS), SKEWNESS, RATING6, HB, COLL, \\ BANK1...6, \log ASSETS, INDUSTRY, TIME2END \end{pmatrix} \quad (1)$$

The results reported in Table 11 indicate major determinants of pool formation. First we direct our attention to the number of bank creditors as an indicator of potential pool size. The coefficient of log (#BANKS) in the pool regression is positive in both specifications, significant at the 1% and the 10% level respectively, telling us that it is more likely that a bank pool is formed when the number of banks is high.

Besides the number of potential pool banks, their relative financing shares have an impact on the probability of pool formation. We find the coefficient of the SKEWNESS-variable to be negative and significant at the 5% and the 1% level respectively, implying low SKEWNESS values (signifying similar financing shares among the banks) to be associated with a high probability of pool formation. Of course, SKEWNESS is a rough proxy for the distribution of lending shares among banks since it only compares the observed bank's lending share with the average lending per bank, i.e. without precise information of other banks' lending figures.

The RATING6-variable can be identified as a strong contributor in terms of significance. The coefficient of RATING6 is positive and significant at the 5% level indicating that a large shock to the creditworthiness of the borrower as expressed by the rating deterioration makes the formation of a pool more likely. A possible explanation for the dependence of pool formation on the rating class is that different lenders may have divergent opinions on the severity of the borrower's loss of quality. To form a pool, eventually all the banks will have to agree that the prospects of the borrower are such that unified action is warranted. This common perception is more likely to develop if borrower quality, as seen by the bank in our sample, is at the lowest rating notch.

Variable	(1.*i*)	(1.*ii*)
CONSTANT	−.884 (.734)	−3.588 (1.880)*
log (#BANKS)	.907 (.309)***	.549 (.333)*
SKEWNESS	−2.150 (1.018)**	−1.725 (1.005)*
RATING6	1.225 (.508)**	1.251 (.531)**
HB	−.246 (.369)	−.151 (.355)
COLLATERAL	−.193 (.513)	−.354 (.515)
BANK1	−.755 (.585)	–
BANK3	.826 (.724)	–
BANK4	−.367 (.491)	–
BANK5	−1.759 (.551)***	−1.546 (.419)***
BANK6	−.196 (.488)	–
log (ASSETS)	–	.253 (.171)
ENGINEERING	–	.480 (.412)
MANUF	–	.569 (.386)
TIME2END1_2	.344 (.378)	.491 (.377)
TIME2END3	.433 (.402)	.205 (.400)
obs	98	95
Mc Fadden R^2	.298	.286

Table 11: Binary probit analysis of pool formation

Standard probit model. Dependent variable pool is equal to one if pool is formed and zero otherwise. Explanatory variables are measured at the distress event. Standard errors in parentheses. Level of significance: ***p=0.01, **p=0.05, *p=0.1.

The coefficient of the COLLATERAL-variable is negative as hypothesized albeit not significant. The housebank variable HB turns out to be insignificant, too. This is remarkable as it suggests that housebanks are not the driving force behind pool formation, at least in this sample. However, although we do not observe it, it is likely that frequently there is a housebank among the borrower's alternative bank relationships.

Furthermore, bank identity plays a role in the formation of bank pools. We find that bank 5 is rather resistant to pool formation compared to others, its coefficient is significantly negative at the 1% level. Industry dummies and TIME2END-dummies measuring the time span after the distress event turn out to be insignificant.

6.3 Determinants of workout success

6.3.1 Ordinary probit

To determine the success of a workout and the impact of a bank pool in this context, we include all relationships in the sample for which at least one period after the rating downgrade is observed. The final sample again consists of 101 relationships. Our dependent variable shall differentiate between successful and non-successful workouts. One way to operationalize workout success relies on bank-internal corporate ratings. As explained earlier, these ratings are expected to represent an unbiased estimate of borrower default probability. The estimates emerge from the information acquired by the bank through the relationship with its borrowers. We define a workout to be successful whenever, at the end of our observation window, the rating has improved beyond the distress category. On our calibrated 1 to 6 rating scale (best to worst), the notches 5 and 6 are reserved for distress, or junk cases, while the notches $1 - 4$ are categorized as investment grade. Thus, success describes a re-emergence of the distressed borrower as a healthy firm by obtaining an investment grade rating (notch 4 or better) during our observation period. The dependent variable will be labeled SUCCESS, and is equal to one if rating 4 or better has been achieved subsequent to the distress rating 5 or 6. The dummy equals zero otherwise. Note, a value of zero does not necessarily imply that the workout has failed, and corporate assets are liquidated. It may simply reflect the fact that the case has not yet been resolved at the end of our observation window. Thus, the dependent variable does not differentiate between "failure" and "not yet resolved". We have chosen investment grade rating as our indicator of successful reorganization because we believe that this is the best performance assessment available in our data. Though one might wish to use other data as well, e.g. the firm's balance sheet data, these are typically not available in distress. The reason is that distressed firms may not provide timely accounting information. This is evident from our data, where the number of missing or stale balance sheet items becomes large after the initial distress event. Since banks do not stop evaluating the borrower quality once the borrower is in distress and accounting data are poor, internal ratings provide the most reliable information for indicating business success or business failure.

Explanatory variables in models (2) and (3) include the existence of a bank pool and the number of bank relationships. The dummy POOL is equal to one if the relationship is embedded in a bank pool and zero if no pool is observed. The variable #BANKS measures the number of bank relationships of the client at the time of the distress event and will also serve as a proxy of poolsize using the interaction term POOLx#BANKS in model (2). Recall that our #BANKS-variable measures the total number of currently active lending relationships as reported in the banks' credit files. Thus, we cannot account for the size of the pool per se. From conversations with bankers we know, however, that under normal circumstances a bank pool comprises all relevant financial institutions.

In order to test whether small and large pools have different effects on workout success, we replace POOL in model (3) by two dummies, POOLSMA and POOLBIG, where POOLSMA equals one whenever there is a pool and the pool has at most 4 member banks. Analogously, POOLBIG is one when a pool exists and the number of banks potentially involved is larger than 4. The reference group here are all relationships where no pool has been formed. Specification (3), therefore, allows for a non-monotonic relationship between pools on the probability of workout success.

Additionally, the set of explanatory variables include the housebank-dummy HB (equal to one if the bank we observe is the housebank), RATING6 measuring the severity of the distress shock, and two industry dummies for engineering and manufacturing business. Since distress can start any time within our window, we expect the success of a workout activity to display some time dependency. The economic consequences of workout activities will not be visible instantaneously, but probably need some time to unfold. Thus, the variable TIME2END captures the time remaining from the onset of distress until the end of our observation window. The reference group is 4 or more years. Table 12 shows the results of the probit analysis.

$$SUCCESS_i = f_i \begin{pmatrix} POOL, \#BANKS, HB, RATING6 \\ INDUSTRY, TIME2END \end{pmatrix} \qquad (2)$$

$$SUCCESS_{ii} = f_{ii}\left(\begin{array}{l} POOLSMA, POOLBIG, \#BANKS, HB, \\ RATING6,\ INDUSTRY, TIME2END \end{array}\right) \quad (3)$$

The results in Table 12 give a clear indication of the relevance of the pool for the success of a workout. We ran two variants of the model. The first described by equation (2) that included a pool dummy, the number of banks and an interaction term of both. In the second, see equation (3), we included small pools and large pools respectively viewed against relationships without pools.

In the first model specification (2) we find that the existence of a pool has a significantly positive impact on workout success. However, a higher number of banks reduces this positive impact reflected in the interaction of both variables. Both the POOL dummy as well as the interaction term POOLx#BANKS are significantly different from zero at the 1% level.

However, with model specification (3) which differentiates small pools vs. large pools, it shows in a different way that the impact of the bank pool is two-fold with respect to the number of banks involved. For small pools, the impact on workout success is positive and for large pools with more than 4 banks involved the impact is negative both at the 1% level of significance[13]. Splitting the pool effect by number of banks involved yields an important result. Although the intention of bank pools is to facilitate workout, pools are actually successful in doing so only if they are small. When pools have many member banks, i.e. 5 or more, we find a negative pool effect. Pools now reduce the likelihood of workout success.

Besides these primary effects, the housebank-dummy HB never turns out to be significant regarding the probability of workout success. Thus, a higher relationship intensity does not translate into a more successful workout management. This observation is interesting in itself because it shows that the presumed informational advantage of the housebank does not automatically imply a special competency in restructuring the client. In fact, a result to the contrary would have been puzzling, since once a workout is initiated, the informational differences between housebanks and other restructuring banks become blurred.

Furthermore, RATING6 does not explain the probability of workout success either. The two industries we controlled for have positive but insignificant signs. Firm size does not explain much, too. The two TIME2END-dummies are insignificant in both specifications.

[13]Coefficient of poolbig is significantly different from zero at the 5% level in model specification (3.*ii*) which controls for size and industry.

Variable	(2)	(3.i)	(3.ii)
CONSTANT	−.500 (.470)	−.255 (.445)	1.119 (1.822)
POOL	4.715 (1.309)***	–	–
POOLSMA	–	1.312 (.462)***	1.178 (.484)**
POOLBIG	–	−1.665 (.504)***	−1.638 (.510)***
#BANKS	.067 (.057)	.038 (.052)	.028 (.058)
POOLx#BANKS	−1.041 (.295)***	–	–
HB	−.260 (.337)	−.358 (.332)	−.379 (.354)
RATING6	−.798 (.585)	−.486 (.523)	−.415 (.536)
log (ASSET)	–	–	−.132 (.167)
ENGINEERING	–	–	.269 (.404)
MANUFACTURING	–	–	.365 (.409)
TIME2END1_2	−.108 (.365)	−.291 (.371)	−.312 (.388)
TIME2END3	.104 (.402)	.029 (.392)	.029 (.402)
obs	100	100	97
Mc Fadden R^2	.278	.269	.285

Table 12: Ordinary probit analysis of workout success

Standard probit model. Dependent variable success is equal to one if rating improves to investment grade (1-4) and zero otherwise. Explanatory variables are measured at the distress event. Standard errors in parentheses. Level of significance: ***p=0.01, **p=0.05, *p=0.1.

6.3.2 Two-stage estimation

Since the pool variable is endogenous, we cannot rule out the possibility that it may be correlated with the error terms in models (2) or (3) respectively. In this case the coefficients in our success-estimation would be inconsistent. A way to estimate model (3) consistently is suggested by Maddala [1983]. Our model is similar to the following system of equations, where y_1^* describes the probability of pool formation which is observed as a dummy y_1. The variable y_2^* describes the probability of workout success, observed as a dummy y_2 as well.

$$y_1^* = \gamma_1' x_1 + \varepsilon_1 \qquad (4)$$
$$y_2^* = \beta_2' y_1 + \gamma_2' x_2 + \varepsilon_2 \qquad (5)$$

There will be two stages of estimation. We take the probit on pool formation (1.*ii*) in the previous section as the first stage (equation (4)). We then use the estimated probability of pool formation to recalculate the variables $\text{PO}\widehat{\text{OLS}}\text{MA}$ and $\text{PO}\widehat{\text{OLB}}\text{IG}$. With respect to the model, we then replace y_1 by $\Phi\left(\gamma_1' x_1\right)$, namely the variables $\text{PO}\widehat{\text{OLS}}\text{MA}$ and $\text{PO}\widehat{\text{OLB}}\text{IG}$, and estimate

equation (5) as a probit or, similar, reestimate model (3.*i*) now based on the estimated probability of a pool formation. The results of the second stage are documented in Table 13.

It is apparent from Table 13 that the results reported earlier are robust

with respect to a possible endogeneity problem. The coefficient of POOLBIG is negative and the coefficient of POOLSMA is positive. Both coefficients are significant at the 5% and 1% level respectively. We therefore conclude that the probability of workout success is a positive function of the existence of a bank pool when the number of pool banks is small and the effect becomes negative when more than 4 banks are involved.

6.3.3 Duration analysis

In determining the probability of workout success, we have so far used two TIME2END-dummy variables controlling for effects of the length of the observation window succeeding the distress event. The underlying hypothesis states that the probability of workout success positively depends on the time span observed. However, these dummies turn out to be insignificant.

It is tempting, therefore, to employ a duration model analyzing workout time on a monthly basis. It specifies workout success using the time spent in distress. The set of explanatory variables coincides with the preceding

Variable	(5)
CONSTANT	−.570 (.469)
$\widehat{\text{POOLSMA}}$	1.305 (.454)***
$\widehat{\text{POOLBIG}}$	−.792 (.398)**
#BANKS	.040 (.052)
HB	−.189 (.320)
RATING6	−.646 (.481)
TIME2END1-2	−.100 (.358)
TIME2END3	.399 (.388)
obs	95
Mc Fadden R^2	.171

Table 13: Two-stage regression of workout success (second-stage results) Standard probit model. Dependent variable success is equal to one if rating improves to investment grade (1-4) and zero otherwise. Explanatory variables include instruments on behalf of poolsma and poolbig calculated from (1.ii) regression results. Standard errors in parentheses. Level of significance: ***p=0.01, **p=0.05, *p=0.1.

Variable	Coeff		
CONSTANT	3.894 (.306)***		
POOLSMA	−.532 (.271)**		
POOLBIG	.945 (.439)**		
#BANKS	−.023 (.040)		
HB	.115 (.238)		
RATING6	.597 (.379)		
obs	100		
percentiles of survival			
survival	0.95	0.75	0.50
time (months)	10.83	30.08	50.65

Table 14: Duration regression of workout success

Duration model using Weibull distribution. Dependent variable durmon equals the time spent in distress measured in months, i.e. the time between the distress event and the rating upgrade to rating class 1-4. Standard errors in parentheses. Level of significance: ***p=0.01, **p=0.05, *p=0.1.

probit regression ($3.i$). The coefficients are expected to have opposite signs compared to the previous probits since the dependent variable is a reverse measure of success. A workout is more successful when recovery is reached in a shorter time period. Thus, the duration model formulates the time dimension of success more explicit than the probit regressions discussed above.

We included the explanatory variables of equation (3) as covariates. The duration model was specified as a loglinear survival model with an underlying Weibull distribution. It yields the following results.

The estimation results support the findings of the probit estimation on workout success presented above. The coefficients of both variables, POOLSMA and POOLBIG, have the expected signs and both are significantly different from zero at the 5%-level. Besides, we find that 95% of all cases spend at least 10 months in distress, 75% of firms spend 30 months or more in distress whereas the median is 50 months.

7 Conclusion

While the distress of corporate borrowers has always been an important topic in financial economics, the more specific question of how the debt structure, in particular with multiple lenders, affects the performance of distressed firms has not yet received much attention. In an influential paper Bolton and Scharfstein [1996] have emphasized that the determination of optimal debt structure is governed by expectations about the costs and benefits of multiple lending. With many lenders, recontracting may be costly or even impossible in distress situations (liquidity default). Morris and Shin [1999] have stressed a different factor that renders multiple lending costly. In their model, firms face the risk of a run on their assets. Inefficient liquidations of firms can only be avoided if creditors can rely upon an effective coordination device. Thus, whatever the benefits of multiple lending, its costs clearly derive from the conflicting interests of many lenders vis-à-vis a cash constrained, distressed borrower.

In this paper, we explore empirically the common pool hypothesis underlying the above argument. We make use of a unique data set which contains detailed first-hand credit-file information on bank behavior in corporate distress and on corporate performance thereafter. The major contribution of our study concerns the identification of bank pools as viable and relevant contractual arrangements. We show that bank pools affect the probability of workout success. The sign of this impact depends on pool size. Small pools (number of member banks below the median) significantly increase the probability of workout success, while large pools tend to reduce the likelihood of success. This finding supports the view that the benefit of pool formation, the exclusion of a run on firm assets, has to be traded off against the negotiation costs among pool members. These costs tend to increase with pool size. The probability of workout success, therefore, first rises and then falls with pool size. The single-peaked workout success function squares well with reports from practitioners who claim that large pools are a nightmare, while small pools seem to operate more smoothly. We have made several attempts to check the robustness of these findings. Different model specifications as well as a two-stage estimation, controlling for endogeneity of the pool variable, all lead to the same conclusions. Furthermore, a duration analysis that substitutes the length of time spent in distress as an alternative success criterion identifies the same factors as significant as the standard probit estimation.

The formation of a bank pool is therefore an important decision, requiring an initial attempt to coordinate the interests of several lenders. In particular, lenders have to be convinced that they will benefit individually from not terminating the relationship with the borrower right away. We have modeled the decision to form a bank pool, which is more likely, according to our results, when the number of banks is large and firm quality is hit by a substantial shock, according to the initial distress rating. Furthermore, the distribution of financing shares among banks capturing free-riding problems has a significant impact on the probability of pool formation. Finally, the housebank is not a driving force behind pool formation. This stands in contrast to earlier findings relating to the special role that housebanks play in normal times, i.e. in non-distress periods.

Several open issues emerge from this study. First, we do not have any information about the dynamics of pool formation. In particular, we do not know what exactly triggers the initiation of the pool, and its stability over time. This is a potentially important issue, since bank pools are a real-world example of a workable solution to the collective action problem.

Understanding the strengths and weaknesses in a free contracting environment may shed light on the construction of workable regulatory solutions in other areas of application. A first step into explaining why bank pools emerge builds on two major characteristics of the German insolvency code, which stand in sharp contrast to the rules of the US bankruptcy code (Chapter 11). The old German insolvency code existed until January 1999, i.e. throughout our entire sample period. Court-supervised proceedings could take one of two routes, compulsory liquidation ("Konkursverfahren"), or settlement ("Vergleichsverfahren"), although the latter has only rarely been chosen. In both cases, control is shifted from the owner-manager to a trustee who is empowered and supervised by the court. There are two important differences to the US code, Chapter 11 in particular. First, debt seniority is respected throughout the proceedings, giving privately negotiated arrangements, especially collateral rights, a true value. Second, the old German code does not stipulate an automatic stay, i.e. a period in which creditors are barred from liquidating their claims, and management can attempt to reorganize the firm. Notably the first aspect, the unconditional acceptance of debt seniority rules, has profound implications for the relationship between borrowers and lenders. It allows creditors to enter into a private contract that stipulates the pooling of claims and cash flows with no fear of unilateral breach of contract, or of free-riding. The structure of the insolvency code therefore offers an explanation of why bank pools can reach stable arrangements among all members. Furthermore, the respect of debt seniority rules by the courts explains why lenders are jointly willing to invest fresh money for workout investments into a distressed company. The common usage of bank pool arrangements to engineer workouts also helps to explain why there are so very few workout activities once a firm has filed for bankruptcy. The reason is that all serious workout attempts that receive support from the lenders are carried out well before the initiation of formal bankruptcy proceedings. If this interpretation is correct, a common criticism of the German Konkursordnung, namely its poor workout incentives, is in fact misplaced. The broader view that is supported by our findings stresses the strong pre-bankruptcy workout incentives embedded in the old code. The code supports timely lender coordination and pool formation, activities which would probably not be supported in a more debtor-friendly legal environment.

It is noteworthy that the above mentioned criticism of the former Konkursordnung has convinced the legislator in Germany to change the bankruptcy code. The new code became effective on January 1, 1999. It is intended to improve the old code by allowing an early start of court proceedings when illiquidity is imminent, and by facilitating the reorganization of the firm. The new code blends elements of the old, creditor-friendly Konkursordnung with an US style, debtor-oriented code. It allows for considerable flexibility regarding possible arrangements among creditors. Since it holds on to respecting individual creditor rights, the basic motivation to form a bank pool is likely to remain intact under the new code. However, the observance of creditor rights is no longer unconditional. Expected illiquidity as a criterion to file for bankruptcy marks the entry into a debtor-friendly system. This may weaken the pool formation incentives of lenders, and it may thereby scale down the willingness to engage in joint workout processes. Cross-country evidence using data from firms operating under different insolvency regimes is needed in order to understand more fully the extent to which debt restructuring and workouts are influenced by the microstructure of bankruptcy legislation.

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Appendix

1 Standard pool contract - Abbreviated English version

The Creditor Pool contract is to be agreed upon as a non-trading partnership between the Pool leader (Bank A),
Bank B,
Bank C,
...
and the company (borrower), as well as third party debtors.

§1 Credit Facilities
· Listing of credit lines granted by the contact for each bank and type of credit concerned.
· The banks agree to uphold the credit lines for the duration of the contract. Reductions or deletions shall only occur by mutual consent. This does not hold for credit commitments granted outside the pool.

§2 Collateral
· Listing of
1a) collateral furnished by the company to the banks and collateral to be furnished per bank.
1b) collateral to be furnished by the company in favor of the pool leader and each individual bank simultaneously and with equal ranking.
2a) collateral furnished by third party debtors to the banks and collateral to be furnished per bank.
2b) collateral to be furnished by third party debtors in favor of the pool leader and of each bank simultaneously and with equal ranking.
· In the event that a specific bank in the future is to be is furnished with collateral with regard to one of the credit lines cited in §1, then this shall considered to be part of the pool contract.
· In the event that a bank extends additional credit, then the collateral furnished in this context shall also be included in the pool contract but shall serve primarily to repay these additional credit facilities.
· The company can furnish collateral to third parties only after having instructed the banks of its intention.

§3 Collateral Purpose

· Company collateral as well as that of third party debtors serves to secure existing and future bank claims arising from the granting of credits cited in §1.

§4 Retransfer/Collateral Release
· When all claims have been satisfied in accordance with §3, then the banks are required to retransfer to the company and third party debtors collateral against which no claims have been made.
· Pool collateral must be partially or wholly released if its realizable value more than temporarily exceeds __% of the secured claims.

§5 Trust Relationship/Collateral Administration
· The Pool leader administers in a fiduciary capacity for the other banks the collateral collected within this contract.
· The release of collateral requires the consent of all the banks.

§6 Realization
· The Pool leader realizes in its own name the collateral cited in §2 for the banks' account.
· When and whether collateral is to be realized is decided by the banks in mutual consent.

§7 Balance Settlement
· As far as possible the company is to draw upon the credit lines cited in §1 equally.
· The banks are committed in the event of realization and as requested at any time by a specific bank to bring into line via transfer entries that part of their credit utilization which does not exceed the credit lines cited in §1, such that it corresponds to that of the credit lines.

§8 Revenue Distribution
· Revenue deriving from the realization of collateral is to be utilized according to the following order of priorities:
a) costs, taxes and other expenses incurred during the administration and realization of collateral, Pool leader remuneration,
b) repayment of the banks' credit demands in accordance with §1 in equal proportion to the utilization after the balance settlement,
c) repayment of those claims exceeding the credit lines in equal ranking with the excesses,
d) repayment of the bank's additional credits in equal ranking to the utilization as long as this has not been ascribed to the utilization of separately

furnished collateral,
e) the satisfying of other bank claims in equal ranking with the ratio of these claims.
· The banks are entitled to alter the distribution key.
· Any revenue ensuing, which is not needed, is to be paid over to the company or the third party creditors respectively.

§9 Costs, Taxes, Remuneration
· All costs and taxes deriving from this Pool contract, particularly those from the administration or any realization, are to be borne by the company.
· In the event that these costs and taxes are not paid by the company, then they shall be borne by the banks in keeping with the credit lines cited in §1.

§10 Briefing
· The banks are to inform each other reciprocally when circumstances become known, which may persistently endanger a repayment of the credit lines cited in §1.
· The banks are required to provide one another on request with information about both debts outstanding to the company and collateral. The banks are exempted from banking secrecy.

§11 Deadlines and Notice of Termination
· The Pool contract is to be drawn up for an unspecified duration.
· Each bank is entitled to terminate the contract with three months notice at the end of a calendar quarter. The Pool contract will continue with the remaining banks.
· In the event of notice being served, the banks are reserved the right of distribution with respect to collateral relating to special agreements.
· At the request of any bank a settlement of balance must be undertaken when the bank which has served notice quits.
· The company and third party creditors may only quit this contract after all obligations from §1 have been met.

§12 Place of Fulfillment and Jurisdiction, and Applicable Law

§13 Contract Amendments and Supplements

§14 Escape Clause

2 Rating standardization

Standardized Rating Category	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6
1 outstanding quality	1 very good risk	1 outstanding quality	1.0 - 1.2 outstanding quality, low risk	1 outstanding perfor- mance, lowest risk	1.00 - 1.49 outstanding quality	A+, A minimum risk,
2 good quality, above average	2 good risk	2 good quality	1.3 - 2.7 good quality, above average	2 high quality, above average	1.50 - 2.49 good quality	A-, B+ low risk
3 average quality, increased risk	3 - 3/4 satisfactory/ adequate risk	3 satisfactory quality with weaknesses	2.8 - 3.7 average quality/risk	3 average performance	2.50 - 2.99 satisfactory quality	B, B- satisfactory risk
4 speculative grade, below average quality	4 sufficient risk	4 sufficient quality, intensive care	3.8 - 4.2 speculative grade, intensive care	4 - 5 sufficient quality, increased risk	3.00 - 3.49 sufficient quality	C+, C high risk, problematic
5 problematic, intensive care, reorg.	4/5 - 5 just sufficient / insufficient risk	5 deficient quality, substantial problems	4.3 - 5.7 default imminent, intensive care/reorg.	6 - 7 intensive care, weak/neg. prospects	3.50 - 4.49 low quality	C- very high risk, insufficient quality
6 default, reorg./liquidation	6 extremely bad risk	6 - 7 inadequate quality, default	5.8 - 6.5 default, reorg./liquidation	8 default, operating loss, neg. prospects	4.50 - 5.00 default or imminent default	D extremely high risk / default, neg. prospect

Table 15: Rating standardization (numbering of banks doesn't correspond with other tables and figures in this paper)

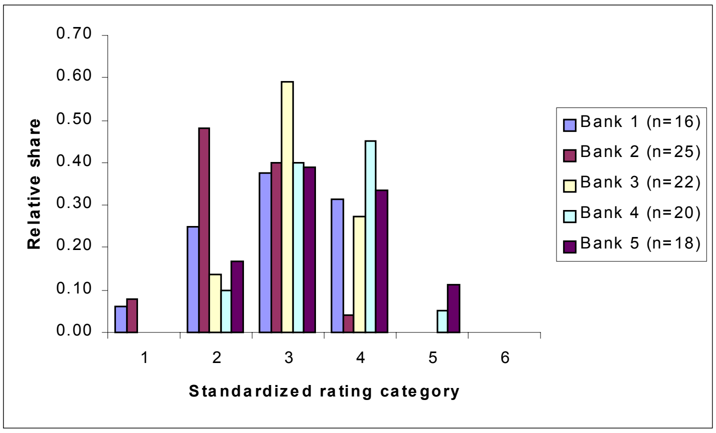

Figure 2: Frequency distributions of internal ratings after standardization , year 1996

3 List of variables

abbreviation	**description**
success	dummy, equals one if firm rating improves (≤4) after distress event
durmon	duration of distress [time betw. distress event and re-emergence, months]
bank$i$	dummy, equals one if the firm's credit files are observed at bank$i$
#banks	number of firm's bank relationships
pool	dummy, equals one if bank pool exists
poolsma (poolbig)	dummy, equals one if bank pool exists and number of bank ≤4 (>4)
poolx#banks	interaction between pool and #banks
skewness	abs. value of deviation of bank's true debt share from proportional share
rating6	dummy, equals one if the initial distress rating is 6 on transformed scale
hb	dummy, equals one if observed bank is housebank
collateral	percentage of bank's loans secured by collateralized assets
log(asset)	log of asset value [in DM1,000]
engineering	dummy, equals one if firm belongs to engineering sector
manufacturing	dummy, equals one if firm belongs to manufacturing sector
time2end1-2 (time2end3)	dummy, equals one if no. of observation years after distress event ≤2 (=3)

Table 16: List of variables

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