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FINNISH BANKING CRISIS: CAN WE BLAME BANK MANAGEMENT?*

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This paper examines the pricing of bank loans using information on Finnish savings banks' loans from 1987 to 1992. Loan rate premia were affected by many factors, some of which are clearly related to riskiness of the borrower and some are not. The likelihood of delinquent payments is also investigated. The results suggest that there are several factors which were not correctly priced. (JEL G 21)

1. Introduction

Banks in Nordic countries ran into serious difficulties in the late 1980s and early 1990s. The problems were characterized by heavy credit losses, a dramatic increase in nonperforming loans and a rapid decline in bank's profitability. These problems necessitated government support on a massive scale. In Finland, in particular, the banking crisis was also associated with a very severe economic recession.

The overwhelming difficulties faced by the banks and the immense costs they entailed for taxpayers have raised several questions. What went wrong in the banking sector? What was the role played by bank management in the developments leading up to massive credit losses? More importantly, if mistakes were made, what can we learn from them? Answers to these questions are sought below.

In this paper I examine loans made by Finnish saving banks over the period 1987–1992. The data is based on a sample of savings bank loans. In addition to individual loan and borrower data, this paper utilizes data on bank-specific and macroeconomic variables.

The data helps us to answer questions concerning the behaviour of bank management both during the credit boom years and during the initial phases of the banking crisis. In addition to questions related directly to banking crises I consider several other issues that have arisen in the current banking literature. These include, for example, credit rationing and the role of collateral in bank lending. These questions have been examined recently by Berger and Udell (1990, 1992) among others.

The paper begins with an investigation of bank loan pricing. I examine which factors have affected loan rate premia, which should reflect mostly the perceived credit risks attached to loans. By requiring higher risk premia from borrowers which are perceived to consitute high credit risk, banks can compensate for the high probability of not receiving all promised cash flows.

Pricing is not, however, the only mechanism by which banks can manage their credit risks. Screening untrustworthy borrowers represents another important way. By lending only to low risk clients the bank can restrict its credit risk. Furthermore, the bank manager can restrict

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lending to a specific borrower, a practice which Blanchard and Fischer (1989) (following Keeton, 1979) call type 1 credit rationing. According to Blanchard and Fischer type 2 credit rationing occurs when, among identical borrowers, some who wish to borrow are able to do so, while others cannot.[1]

Pricing and allocating loans are fundamental issues for banks. There are reasons why one can expect banks to be in a superior position as regards pricing loans. There is a current literature which emphasizes that banks are specialized in producing information and lending to borrowers for whom information problems are likely to be most severe, see e.g. Diamond (1984) and Seward (1990). Banks should be especially capable of analyzing and screening potential borrowers and thus of allocating and pricing loans. The very existence of banks is largerly based on this advantage.

In addition to examinig loan pricing I investigate how factors which have decreased or increased loan rate premia have reflected the riskiness of the borrower in the ex post sense. This is possible because the data includes observations on the borrower's nonperforming loans.

The plan of this paper is as follows. The next section describes the data. Section 3.1 gives the empirical results from the loan rate premia regressions and section 3.2 examines how pricing decisions change over time. In section 4 I investigate the non-performing loans. Finally, conclusions are provided in section 5.

2. *Description of the sample*

2.1 Sample

The paper is based on a sample drawn from the savings banks' clients. The whole data consists of four subsamples surveyed on 31 July 1992. Each subsample consists of about 2 500 borrowers classified by customer group and according to whether the borrower has nonperforming loans. I also utilize data on municipalities, macroeconomic variables and bank funding.

The samples were combined so that the possible overlapping observations were deleted. Furthermore, the data was screened in the following way.

I investigate only those borrowers who had floating rate loans as at 31 July 1992. Thus the results will be conditional on the bank having lent to a specific customer and the loan rate being linked to open market rates. The floating rate loan considered must also be the borrower's largest loan on which the sample contains most information.

The open market rates considered here are (short-term) Helibor rates or three and five-year long-term market rates. Observations on borrowers with loan linked to other rates or fixed-rate loans as well as observations for borrowers without loans were omitted. Loans with a zero interest rate and loans on which some data was missing were also omitted. The sample does not contain information on foreign currency loans.

As I only consider borrowers, who have floating rate loans, it is possible to measure exactly the difference between the loan rate and the riskless open market rate and thus also the loan rate premium. By examining only floating rate loans it is also possible restrict the probability that the sample includes loans that are subsidized in some way by the public sector.

The loans investigated were made over the period 1987–1992. Thus all of them could be financed by money market funds, implying that open market rates are relevant reference rates.

After the screening procedure, the sample consists of 1908 borrowers. About half of whom have nonperforming loans. Thus the borrowers with nonperforming loans have a disproportionate share in the sample.

2.2 Variables

Loan rate premium

The dependent variable is the difference between the loan rate and the corresponding open market rate measured at the time when

[1] *As an interesting anecdote, the committee of review on consumer loan legislation states in its report that banks should be prohibited from treating identical borrowers differently when making loans, i.e. banks should not ration loans in the type 2 sense; see Kulutusluottolainsäädännön tarkistamistoimikunnan mietinnöt, Komiteamietintö 1993:7.*

Table 1. Data

Variable		mean	st. deviation
PREE	Loan interest rate minus the corresponding open market rate	0.0200	0.0142
COLL1	Equals one for a loan secured by real estate (other than a single-family house)	0.1284	0.3346
COLL2	Equals one for a loan secured by a bank deposit	0.0063	0.0791
COLL3	Equals one for a loan secured by name	0.3428	0.4748
PART1	Equals one if the borrower is also a depositor, but has another bank as a main bank	0.0115	0.1068
PART2	Equals one if the borrower has another bank as a main bank and is not a depositor	0.3485	0.4766
CORPOR	Equals one if the borrower is a corporation	0.1420	0.3492
SMALL	Equals one if the borrower is a small entrepreneur	0.0645	0.2456
FARM	Equals one if the borrower is a farm	0.0849	0.2788
SIZE	Size of the loan (FIM 00 000's)	2.1742	2.7352
RATE	Level of the reference open market rate	0.1252	0.0157
GDP	Real growth of GDP	0.0028	0.0384
LONG	Equals one if the loan rate is based on 3 or 5 year market rate	0.3606	0.4803
FARMING	Share of agriculture and forestry, (%)	3.4436	6.0129
MARKET SHARE	Bank's share of total deposits *, (%)	29.5728	13.2267
DEPO/ POPULA	Ratio of deposits to the population in the municipality *, (FIM 000's/capita)	59.7068	16600.6641
DOZEN	Equals one if the bank belongs to group consisting of the 12 worst banks	0.2479	0.4319
GROUP35	Equals one if the bank did not join the SBF	0.1387	0.3454
CASH	Equals one if the loan was made between 1. March 1989–28. February 1990	0.1803	0.3845
TAX	Equals one if the loan was made after 1990	0.3354	0.4723

*: variable is used in logarithmic form in regressions and logit-analysis.

the loan was made. This variable is called the loan rate premium. Table 1 contains summary statistics for the loan rate premium as well as other variables. The distribution of the loan rate premia is graphed in Figure A1 in the appendix.

Loan and borrower-specific variables

The dummy variables COLL1, COLL2 and COLL3 indicate the type of collateral used to secure the loan. The description of the variables is presented in table 1. The largest group consists of loans backed by personal security, where the guarantee is given either by the borrower or some other person(s). The reference group is the largest group i.e. loans secured by a single-family house or shares in a housing corporation.

The dummy variable LONG indicates that the loan rate was tied to long-term open market rates, i.e. either three or five-year market rates.

The variable SIZE measures the size of the loan at the time the loan was made. This variable is partly estimated.[2] The results were, however, quite robust with respect to the as-

[2] *The data includes observations of the borrower's lending stock, from which the size of the loan can be calculated in over half the cases. In these cases the borrower has only one loan or two loans, one of which is fixed rate loan. The sample includes observations of the stock of the fixed rate loans. In the remaining cases the size of the loans is probably overestimated. Furthermore I had to estimate the size of the loan on the initial lending date, because the observation is from the date when the sample was made. I assume that the loans are repayable in equal instalments and that the average maturity is seven years.*

sumptions made. For example, the results were essentially the same when the size of the loan was replaced by the stock of the loans as measured on the sample date.

The variables PART1, PART2, CORPOR, SMALL and FARM indicate the group of which the borrower belongs. Again, the description of the dummy variables is given in table 1.[3] The reference group is households (incl. pensioners), which is also the largest group.

Macro and bank variables

The variable GDP is the annual real growth of GDP measured with a lag of three months. It is measured as a logarithmic difference. The variable RATE is the comparable open-market rate for each loan.

The variable MARKET SHARE measures the bank's market share. It is the ratio of the bank's deposits to all banks deposits measured in the municipality where the bank's main office is located. In the analysis the variable is used in logarithmic form.

Two other bank variables measure the economic structure of the municipality where the bank's main office is located and the potential for deposits. DEPO/POPULA is the ratio of all banks' deposits to the population in the municipality where the bank's main office is located. This variable may reflect the supply of funds to banks as well as wealth differences across municipalities. This variable is also expressed as a natural logarithm. The variable FARMING is the percentage of the population working in the agriculture and forestry sector in the municipality where the bank's main office is located.

The dummy variables DOZEN and GROUP35 indicate two subgroups within the savings banks. The variable DOZEN is one, if the bank was one of the twelve experiencing the greatest difficulties. This group has also been called the »dirty dozen» in the press. GROUP35 indicates whether the bank joined the Savings Bank of Finland (SBF), which was founded in 1992.[4] They make it possible to investigate whether the pricing and lending decisions of the banks which did not join the SBF differ from other banks' decisions.

Other dummy variables

The dummy variable CASH is one, if the loan was made between February 1989 and March 1990. During this period there was an agreement in force between the Bank of Finland and the banks which supplemented the existing cash reserve agreement and enabled the central bank to raise the cash reserve requirement. The collection of additional deposits, which in contrast to ordinary cash reserves were non-interest-bearing, was linked to the growth of each bank's or group of banks' personal or total lending. The central bank sought to increase banks' lending costs and thereby their lending rates in relation to market interest rates, i.e. it tried to increase loan rate premia.

The dummy variable TAX indicates whether the loan was made after 1990. A final withholding tax on bank deposits was introduced at the beginning of 1991.

3. Results

3.1 Regression results

Regression results are reported in Table 2.[5]

According to the results the loan rate premia have been higher for loans secured by name than for other loans. The coefficient of the dummy variable COLL3, which indicates whether the loan is secured by name, is statistically significant.[6] Other types of collateral do not differ from each other.

[3] *Peisa and Solttila (1992) have investigated the banking crisis in the light of corporate data. Rantala (1992) has recently examined credit risk premia theoretically for different sectors.*

[4] *GROUP35 excludes the saving bank AKTIA, which did not join the SBF.*

[5] *As discussed in section 2 borrowers with nonperforming loans are oversampled. The loan rate premium is assumed to reflect mainly expected credit losses and thus expected delinquent payments. Thus whether or not the borrower has delinquent payments is an exogenous variable under the null hypothesis and OLS can be used in regressions (see Maddala, 1983).*

[6] *Berger and Udell (1990) have examined the role of collateral with U.S. data consisting of commercial loans. According to their results collateralized loans have been riskier than loans without collateral. Furthermore, companies which pledged collateral were on average more risky than companies which did not pledge collateral. These results can be interpreted as indicating that banks require collateral from riskier borrowers.*

Borrowers having deposits in the bank in question, but whose main bank is another bank, have paid a relatively lower rate of interest on their debt than other borrowers. In contrast, corporations and farms have paid a relatively higher rate on their loans. The differences are, however, quite small according to the sizes of the coefficients.

The variable LONG is statistically significant and negative. Loans tied to long-term market rates have been associated with lower loan rate premia than loans tied to Helibor rates. The average loan rate for loans tied to long-term market rates was two percentage points below the loan rates for loans tied to Helibor rates.

The size of the loan has also affected the price of the loan. The variable SIZE is statistically significant. The coefficient is negative. Thus loan rate premia have been smaller for larger loans. This conform with the results presented by Berger and Udell (1990) using U.S. data. According to their results larger and longer-term loans generally have lower loan rate premia; see also Hannan (1991a). These findings might be explained by scale or information arguments.

The dummy variable CASH is not significant. This implies that the change in the banks' cash reserve requirement and the target for banks' credit growth did not affect the interest rates charged on bank loans.[7] Similarly, the dummy variable TAX was not significant.

Both the macroeconomic variables, GDP and RATE, are clearly significant. High GDP growth has been associated with lower loan rate premia. Correspondingly, lower GDP growth implies higher premia. Thus developments in loan rate premia have been pro-cyclical. This result is consistent with the evidence presented by many other researchers; see for example Mishkin (1991). However, in the case of Finland the loan rate premia may also have been affected by exogenous policy decisions. This issue is discussed in more detail in section 3.2.

Table 2. Regression results

variable	SAMPLE1	SAMPLE2
constant	0.0332**	0.0317**
	(5.33)	(6.27)
COLL1	–0.0010	–0.0011
	(–1.04)	(–1.40)
COLL2	–0.0070	–0.0037
	(–1.95)	(–1.13)
COLL3	0.0024**	0.0020**
	(3.35)	(3.57)
LONG	–0.0088**	–0.0085**
	(–12.87)	(–15.11)
SIZE	–0.0008*	–0.0005*
	(–2.34)	(–2.04)
PART1	–0.0075**	–0.0016
	(–2.79)	(–0.64)
PART2	0.0013	0.0014*
	(1.83)	(2.42)
CORPOR	0.0020*	0.0009
	(2.11)	(1.26)
SMALL	0.0008	–0.0002
	(0.61)	(–0.20)
FARM	0.0024*	0.0025*
	(1.99)	(2.56)
GDP	–0.0845**	–0.0754**
	(–4.24)	(–4.65)
RATE	0.0390*	0.0531**
	(2.11)	(3.54)
FARMING	–0.0002**	–0.0001**
	(–2.92)	(–3.05)
DEPO/POPULA	–0.0028*	–0.0023*
	(–2.53)	(–2.54)
MARKET SHARE	–0.0012	–0.0016**
	(–1.56)	(–2.75)
DOZEN	–0.0003	0.0016**
	(–0.43)	(2.93)
GROUP35	–0.0002	–0.0000
	(–0.17)	(–0.03)
CASH	–0.0003	–0.0001
	(–0.30)	(–0.09)
TAX	0.0015	0.0020
	(0.99)	(1.68)
NOBS	1908	1814
$\bar{R}^2$	0.2503	0.3196
SEE	0.0123	0.0097

SAMPLE2 is SAMPLE1 excluding the observations with negative loan rate premia. t-statistics are in parentheses. * = significantly different from zero at the 5 % level, ** = significantly different from zero at the 1 % level. NOBS is number of observations. SEE is the standard error of estimate.

[7] *This result may be bank-group specific. The savings banks' reaction to the change in the cash reserve requirement was probably different from the reactions of other banks or bank groups, thus the results cannot be generalized to the whole banking sector. The savings banks' reactions are documented, for example, in Saari (1992, pp. 173 and 182).*

The variable RATE facilitates us to discuss credit rationing. Recently, Berger and Udell (1992) have investigated empirically the significance of credit rationing using U.S. panel data. They noticed that credit rationing implies that loan rates are sticky with respect to changes the open market rates. In other words, the loan rate does not fully respond to changes in open market rates under the null hypothesis of credit rationing. From this point of view they examine whether banks raise the interest rates on new loans by an amount corresponding to a given rise in open market rates or whether they ration credits.

The coefficient of the variable RATE is significant and positive. Accordingly, an increase in the open market rate implies higher loan rate premia for new loans. Open market interest rates are more than fully transmitted to loan rates in contrast to the credit rationing hypothesis, which states that the adjustment is slow. Note, however, that the effect is small. A one percentage point increase in open market rates increased loan rate premia by only four basis points.

The regressions were also re-run using the Berger and Udell (1992) specification, where the RATE variable is included both in level and squared form (these results are not presented here). The results hold also with this specification. The loan rates adjust more than one-to-one to changes in open market rates. The credit rationing arguments are discussed further in section 3.2.

The variable FARMING is clearly significant and the coefficient is negative. Banks located in municipalities, where the agriculture and forestry sector is important, made cheaper loans than other banks.

According to the results, the relatively high level of average deposits in a municipality where a bank's main office is located reduces the loan rate premia. The wealthier the population, as measured by the DEPO/POPULA ratio, the cheaper the loans have been.

At this stage the banks' variables MARKET SHARE, DOZEN and GROUP35 are not statistically significant even though the market share is significant at the 10 % level.

The data used so far include observations where the loan rate premium is negative, i.e. the rate charged on risky debt is lower than the riskless open market rate. This may be due to pricing decisions where the reference rate has not been the open market rate but rather the bank's average funding cost. Negative loan rate premia may also be a result of the need to support borrower by low interest rates in order to avoid bankruptcy costs.

I re-ran the regressions with the data from which the negative loan rate premia observations were omitted. The results are presented in the right column in Table 2 (»SAMPLE2»).

As can be seen, the results are very similar. For brevity, I concentrate in discussing the most interesting finding, i.e. the role of the market share in determining loan rate premia.

With restricted data the MARKET SHARE is statistically significant at the 1 % level. The coefficient is negative. According to this result a large market share decreases the loan rate premium. The result leads to the following question: why doesn't a powerful market position indicate higher loan rates as often is assumed (see, for example, Hannan, 1991b)? At least two possible explanations for the result can be offered.

The first is that the result may be due to the fact that banks have used the market power especially in funding. For example, Berger and Hannan (1989) showed with U.S. data that in concentrated markets banks payed a lower interest rate than in less-concentrated markets. It is possible that a strong market position as measured by deposit share can reduce funding costs. If the pricing decision has been based on average funding costs instead of marginal-costs, i.e. open market rates, a strong market position may lead to lower lending rates.

A second possible explanation is that banks may have increased their market share through low lending rates. Banks may have attracted new customers and deposits by offering cheaper loans. In this case the market share may be endogenous to loan rates.

Other changes concern the significance of the borrower group and the dummy variable DOZEN in determining loan rate premia.

3.2 Did pricing decisions change?

In October 1990, the Bank of Finland drew up a restructuring programme aimed at managing Skopbank's large risk exposures and strengthening its capital base. The programme implied that the savings banks should restrict their lending growth, as Skopbank was provid-

ing them with both short-term markka and foreign currency funding.[8]

In this section I re-run regressions for subsamples and examine whether the pricing decisions before and after the central bank's programme differ from each other. The first subperiod is from the beginning of 1987 to the end of March 1990. The second subperiod is the rest of the time span under investigation. It should be noted, however, that if differences are found, they cannot be assumed to be solely due to the central banks programme; there may be several other factors at work.[9]

I also calculate the parameter values of the Chow stability test statistics for both unrestricted and restricted samples. The alternative hypothesis is that there was a structural break at the end of March 1990. With both samples the null hypothesis of parameter stability was rejected.[10]

Table 3 presents regression results separately for the first and the second subperiod. The results differ across subsamples.

One of the differences between the subperiods is that in the second subsample the loan rate premia do not depend on collateral. It should be noticed that, for example, loans backed by personal security do not differ from other loans in the second subperiod.

Furthermore, the significance of real growth diminishes in the second subsample. In the second subperiod the loan rate premia did not react to changes in real growth. In this period economic activity was well below the full employment level. During the recession the loan rate premia do not react to whether GDP has decreased by two or four per cent annually.

Of the bank variables, the FARMING- and DEPO/POPULA-variables are not statistically significant in the second subperiod. On the other hand the impact of market share is more pronounced in the later subperiod than in the first subperiod.

Table 3. Subperiod results from regressions

variable	PERIOD 1	PERIOD 2
constant	0.0364**	0.0514**
	(6.00)	(5.14)
COLL1	–0.0011	–0.0011
	(–1.19)	(–0.77)
COLL2	–0.0065	–0.0032
	(–1.37)	(–0.70)
COLL3	0.0031**	0.0002
	(4.39)	(0.20)
LONG	–0.0086**	–0.0086**
	(–12.46)	(–8.93)
SIZE	–0.0004	–0.0007
	(–1.16)	(–1.61)
PART1	–0.0015	–0.0018
	(–0.44)	(–0.50)
PART2	0.0009	0.0022*
	(1.34)	(2.24)
CORPOR	0.0003	0.0021
	(0.34)	(1.53)
SMALL	–0.0015	0.0022
	(–1.23)	(1.35)
FARM	0.0018	0.0036*
	(1.43)	(2.37)
GDP	–0.1280**	–0.0045
	(–5.02)	(–0.22)
RATE	0.0515**	–0.0862*
	(2.92)	(–2.20)
FARMING	–0.0002**	–0.0001
	(–2.90)	(–1.32)
DEPO/POPULA	–0.0033**	–0.0008
	(–2.99)	(–0.49)
MARKET SHARE	–0.0013	–0.0027*
	(–1.91)	(–2.40)
DOZEN	0.0014*	0.0026**
	(2.09)	(2.59)
GROUP35	0.0012	–0.0014
	(1.27)	(–1.12)
NOBS	1152	662
$\bar{R}^2$	0.2718	0.1735
SEE	0.0093	0.0102

Results are based on SAMPLE2. Period 1 is 1987/01–1990/11 and period 2 1990/12–1992/7. t-statistics are in parentheses. * = significantly different from zero at the 5 % level, ** = significantly different from zero at the 1 % level. NOBS is number of observations. SEE is the standard error of estimate.

[8] *The Bank of Finland finally took control of Skopbank in September 1991.*

[9] *There are several other reasons why pricing decisions may have changed. The most notable reasons are the introduction of the withholding tax at the beginning of 1991 and a learning process. Market-based pricing was still a new phenomenon for the bank managers in the late 1980s, because of long-standing restrictions on banks lending and capital movements. The last restrictions on bank lending were abolished in 1986. Furthermore, expectations of tigher increasing solvency requirements could have affected pricing decisions.*

[10] *The value of the Chow stability test statistics was 2.25 with the unresticted data and 2.90 with restricted data. Both values are significant at the 1 % level. The test statistics follow F(18,1874) and F(18,1780) distributions.*

The coefficient of the interest rate is significant in both samples, but the sign changes. As the interest rate increased in the first period, the loan rate premia increased as well, but the relationship was reversed in the second period.[11] According to this result, banks did not fully adjust their rates for new loans to changes in open market rates during the second subperiod. One explanation for this is credit rationing as discussed in section 3.1. The second possible explanation could be that when making new loans to old customers banks can smooth out large interest rate changes. This may be the case especially for borrowers in financial distress. In such cases the increase in the loan rate does not necessarily increase expected revenue from the loan as the likelihood of default increases.

The loan rate stickiness was further studied using the Berger-Udell specification. The corresponding subperiod results are presented in table A1 in the appendix.

In the first subsample the results are similar to the results presented in Table 3. The coefficient of MARKET SHARE is estimated using the Berger-Udell specification more precisely and is statistically significant at the 5 % level.

In the second subsample, on the other hand, the significance of RATE and RATE2 vanishes (RATE2 is the square of the variable RATE). Thus I found no evidence of loan rate stickiness in the second subperiod using this specification, in contrast to above result. Taken together, the results in this paper do not provide any strong evidence on credit rationing.

4. *What went wrong? An analysis of nonperforming loans*

In the previous section I investigated the pricing of bank loans. The loan premia should reflect the perceived credit risks attached to loans. In this section I examine how accurately pricing has reflected these credit risks. I examine how the variables which affect the price of the loan reflect the probability of arrears in interest and/or principal payments. Furthermore, I examine whether there some factors which were not priced according to the results presented above which, however, affect the probability of delinquent payments. The differences between factors affecting loan rate premia and delinquent payments can be indicative for pricing being based on certain considerations besides credit risk or forecasting errors.

I examine credit risk by investigating nonperforming loans. A loan is regarded as nonperforming when the payment of interest or repayment of principal is in arrears by more than three months. About half of the borrowers in the sample have nonperforming loans. The average outstanding amount of nonperforming loans is almost FIM 300 000 for each debtor with nonperforming loans.

I analyze credit risk by means of logit analysis, where the dependent variable is whether the borrower has (or does not have) nonperforming loans at the time the sample was made. Observations of the stock of nonperforming loans are for each borrower. In principle nonperforming loans can arise from other loans as well as from the loans considered above, whenever the borrower has more than one loan. The explanatory variables are the same as in the previous section. The advantage of logit analysis is that the oversampling of borrowers with nonperforming loans affects only the constant term; see for example Maddala (1992).

Results from the logit-models are presented in Table 4. Results are presented for both the whole sample and the sample in which observations with the negative loan rate premia have been omitted. There are no fundamental differences between the results.

Personal security, real estate collateral (other than a single-family house), large loan size, a high interest rate level when the loan was made and high real GDP growth increase the probability that nonperforming loans will arise. The probability of having nonperforming loan is higher among other groups than it is among households. It is especially high for farms and small entrepreneurs. This corresponds to the general situation in 1992. Credit losses and nonperforming loans were mainly due to sectors other than households; see Pensala and Solttila (1993).

Loans secured by name or real estate (other than single-family house) appear to be riskier than loans secured by other types of collateral.

[11] *GDP evolves quite differently in different subperiods. This raises the question as to whether the sign of RATE is robust to the inclusion of GDP. The answer is yes. The results were robust no matter whether the GDP variable was included in the model or not.*

Table 4. Results from logit-analysis

variable	SAMPLE 1	SAMPLE 2
constant	−1.9707	−1.9096
	(−1.56)	(−1.47)
COLL1	0.5136**	0.5488**
	(2.56)	(2.66)
COLL2	−0.5699	0.0787
	(−0.75)	(0.09)
COLL3	0.9947**	1.0393**
	(7.10)	(7.22)
LONG	−1.0794**	−1.0510**
	(−7.79)	(−7.35)
SIZE	0.7794**	0.7964**
	(10.96)	(10.76)
PART1	0.7686	1.3138*
	(1.55)	(2.34)
PART2	1.6330**	1.6412**
	(12.14)	(11.83)
CORPOR	2.1623**	2.1451**
	(11.27)	(10.97)
SMALL	2.3156**	2.2664**
	(9.19)	(8.87)
FARM	2.4392**	2.4126**
	(9.40)	(9.01)
GDP	9.6467*	9.7976*
	(2.37)	(2.34)
RATE	8.6011*	9.8114**
	(2.33)	(2.57)
FARMING	0.0148	0.0130
	(1.32)	(1.08)
DEPO/POPULA	−0.1616	−0.2198
	(−0.71)	(−0.94)
MARKET SHARE	−0.0298	−0.0326
	(−0.20)	(−0.22)
DOZEN	0.0160	0.0533
	(0.12)	(0.38)
GROUP35	−0.0638	−0.0173
	(−0.34)	(−0.09)
CASH	−0.0828	−0.0806
	(−0.48)	(−0.45)
TAX	−0.2637	−0.2733
	(−0.89)	(−0.89)
NOBS	1908	1814
log(L)	−962.09	−910.95
Number of correct predictions (percentage of obser., %)	1442 (75.58)	1375 (75.80)

SAMPLE 2 is SAMPLE 1 excluding the observations with negative loan rate premia. t-statistics are in parentheses. * = significantly different from zero at the 5 % level, ** = significantly different from zero at the 1 % level. NOBS is number of observations. Number of correct predictions indicates the number of observations where the estimated likelihood of receiving an observed value (0 or 1) is higher than half.

According to the results presented in section 3 loans secured by personal guaranty have higher loan rate premia. In this respect pricing has reflected credit risks correctly. On the other hand, the loan rate premia of loans secured by real estate other than a single-family house did not differ from other loans even though the result presented here indicate that these loans involve more credit risk.

Somewhat surprisingly, loans secured by bank deposits do not differ from other loans. The reliability of this result is, however, diminished by the fact that the number of observations in this group is small.

SIZE has a positive coefficient and its coefficient is statistically significant at the 1 % level. This is particularly interesting in light of the evidence presented in previous sections, as it indicates that when the size of the loan increases, the likelihood that the borrower has nonperforming loans grows. On the other hand, according to the evidence presented in the previous sections loan rate premia tended to be smaller for large loans.

Furthermore, the credit risk associated with loans tied to long-term market rates has been lower than loans tied to Helibor rates.

The loans made during the economic boom have been riskier than loans made during the recession. In the period 1987–1989, the growth of bank lending was very high. At its peak 1988, the growth of bank lending was over 30 per cent in nominal terms. This was far in excess of what could be considered reasonable credit growth given the growth in the real economy at that time. The high rate of credit growth was possible partly because of new clients, some of whom must have been especially risky.[12]

The probability of a loan becoming nonperforming also increases if interest rates were at a high level when the loan was made. These results are consistent with models which emphasize that under high interest rates the most likely borrowers are those with high credit risk (Stiglitz and Weiss, 1981).

This so-called adverse selection – effect was investigated further by replacing the RATE variable by the loan rate measured at

[12] *Even though my result is expected, the difference may be overestimated, because the risks related to the loans made during the recession are not yet fully realized given that these loans are newer than loans made under the boom years.*

the time the loan was made.[13] These results are also consistent with the previous results. A high loan rate increases the probability that the borrower will have non-performing loans.[14]

The bank variables MARKET SHARE, DEPO/POPULA and FARMING are not statistically significant. The result is interesting in the light of the fact that these variables affect loan rate premia. According to this result banks, which are located in municipalities, where a high share of population works in the agriculture and forestry sector, and which are thus often loacted in small municipalities, did not enjoy any particular information advantage which has been reflected in decreased default risk. These results confirm the interpretation that the variables in question reflect each bank's funding costs and not the credit risk of the borrowers.

Two other bank variables, DOZEN and GROUP35, were not statistically significant. Taken at its face value this would imply that the loans of problem banks do not differ from other banks' loans with respect to the credit risk! The result can be partly explained by the fact that the sample does not include loans with zero-interest rates. In the worst banks, zero-interest loans account for the great proportion of the problem banks' assets. Furthermore, off-balance sheet activities are not considered here.

The dummy variables CASH and TAX are not significant. The result is not surprising, because the measures captured by the variables should not affect the borrower's credit risk. On the other hand, the results indicate that during the time the additional cash reserve agreement was in force there was no change in the mix of borrowers, for example, because of credit rationing.

The corresponding results from the subsamples are presented in Table 5. The results from the first subperiod do not differ essentially from the results from whole period. The coefficient of DOZEN is estimated more precisely in the first subsample than in the whole period, but the variable is still insignificant at the 5 % level.

Table 5. Subperiod results from logit-analysis

variable	PERIOD 1	PERIOD 2
constant	–4.1145*	5.8443*
	(–2.50)	(2.29)
COLL1	0.5719*	0.4941
	(2.13)	(1.45)
COLL2	–0.3235	0.7245
	(–0.31)	(0.56)
COLL3	0.9188**	1.2466**
	(4.98)	(5.19)
LONG	–1.1770**	–0.8808**
	(–6.56)	(–3.46)
SIZE	0.7723**	0.9025**
	(7.98)	(7.36)
PART1	1.3108	1.3887
	(1.66)	(1.74)
PART2	0.5974**	1.8224**
	(9.50)	(7.16)
CORPOR	2.2321**	2.1957**
	(8.92)	(6.58)
SMALL	2.2408**	2.5694**
	(6.60)	(6.21)
FARM	2.5023**	2.5696**
	(6.01)	(6.61)
GDP	–0.0510	28.7639**
	(–0.01)	(5.09)
RATE	9.7608*	–13.7696
	(2.06)	(–1.43)
FARMING	0.0114	0.0214
	(0.62)	(1.28)
DEPO/POPULA	0.2304	–1.0389*
	(0.77)	(–2.52)
MARKET SHARE	0.1848	–0.3873
	(1.01)	(–1.36)
DOZEN	0.3117	–0.4365
	(1.77)	(–1.70)
GROUP35	–0.0819	0.0639
	(–0.33)	(0.21)
NOBS	1152	662
log (L)	–580.46	–314.91
Number of correct predictions (percentage of obser., %)	865 (75.09)	507 (76.59)

Results are based on SAMPLE 2. Period 1 is 1987/01–1990/11 and period 2 1990/12–1992/7. t-statistics are in parentheses. * = significantly different from zero at the 5 % level, ** = significantly different from zero at the 1 % level. NOBS is number of observations. Number of correct predictions indicates the number of observations where the estimated likelihood of receiving observed value (0 or 1) is higher than half.

[13] *For brevity I do not report results here.*

[14] *The sample includes a very small number of loans which were granted at the time of very high interest rates associated with speculation attacks against the markka. This may be due to both decreased loan demand and bank rationing.*

There are more changes in the second subperiod with respect to the whole period results. First, the wealth of potential clients as measured by the DEPO/POPULA ratio reduces the likelihood of payment arreas in the second subperiod. Second, the coefficient of RATE is no longer significant in the second subperiod. Interestingly, the sign of the coefficient changes.

I further examine the impact of open market rates by replacing the corresponding open market rate by the three month Helibor rate as measured at the time the loan was made. These results are presented in table A2 in the appendix. The story here is the same as above with the difference that the coefficient of INTEREST is significantly different from zero in both subperiods. In the first subperiod the coefficient is positive and the second subperiod negative.

These results are consistent with results from loan rate premia regressions: the significance of the open market rates changes when moving from the first subperiod to the second subperiod. The above results suggest that the screening of the borrowers has been more successful in the second subperiod than in the first subperiod as interest rates have increased.

5. *Conclusions*

This paper has examined the pricing of loans in the savings bank group in the period 1987–1992. The data spans both the time when the foundations for the subsequent massive credit losses were laid and the first years of banking crisis.

The major empirical results are presented in Table 6. As in earlier studies – conducted mostly using US data – developments in loan rate premia are pro-cyclical. During the boom, income and yield-expectations are high and loans are cheap. During the recession, by contrast, loan rate premia tend to increase. In the worst case, banks bring about or deepen the recession.

The evidence presented in this study shows that several factors besides perceived credit risk or macroeconomic conditions have affected the loan rate premia. Cheaper loans have been available banks located in municipalities with a high deposit to population ratio, from banks with a strong market position and from banks located in the municipalities, where a high share of population works in the farming and forestry sector. This indicates that average funding costs have been lower for these banks than for other banks and that lower funding costs have been reflected in lower loan rates.

Furthermore, loans tied to long term market rates have had lower loan rate premia than the loans tied to Helibor rates. These loans have also been less risky than the loans tied to short-term market rates. On the other hand, the old rule according to which the longer and larger the loan, the lower the interest rate, no longer seems to be valid. The larger the amount of outstanding loans, the greater the probability that the borrower has nonperforming loans.

This paper represents one step towards the analysis of the roots of the Finnish banking crisis. I have concentrated in one factor: bank management and loan pricing. However, there is always several reasons for banking crises. Much more work needs to be done. Other issues need to be studied more carefully; among these are bank credit screening mechanisms, the role of collateral and incentives faced by bank managers with respect to the short-term and long-term credit risks.

Table 6. Summary of Major Empirical Results

The loan rate was low with respect to the corresponding open market rate, if

(i) – the loan was made during the boom,
(ii) – open market rates were low when the loan was made,
(iii) – the loan was tied to long-term market rates and/or
(iv) – the loan was a large one.

Furthermore, it was cheaper to raise a loan from a bank which

(v) – had a strong market position,
(vi) – had its main office in a municipality with a high share of the population working in the farming and forestry sectors and/or,
(vii) – had its main office in a municipality, where the ratio of banks deposits to population was high.

A bank should have required a high loan rate premium from a borrower, if

(i) – the loan was secured either by personal guaranty or real estate (other than a single-family house),
(ii) – the loan was large,
(iii) – the borrower was a client other than a household,
(iv) – the loan was made during the boom and/or
(v) – open market rates were high.

The location of the bank does not affect the riskiness of the borrowers.

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Appendix

Table A1. Subperiod results from regressions using the Berger and Udell (1992) specification

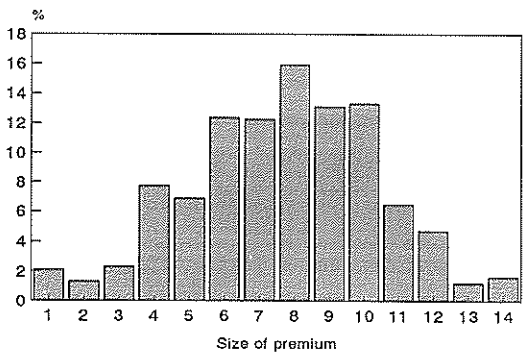
variable	PERIOD 1	PERIOD 2
constant	–0.0090	0.0892**
	(–0.64)	(2.52)
COLL1	–0.0012	–0.0011
	(–1.21)	(–0.76)
COLL2	–0.0069	–0.0035
	(–1.47)	(–0.77)
COLL3	0.0031**	0.0002
	(4.33)	(0.24)
LONG	–0.0091**	–0.0084**
	(–12.99)	(–8.46)
SIZE	–0.0004	–0.0007
	(–1.13)	(–1.55)
PART1	–0.0017	–0.0017
	(–0.51)	(–0.46)
PART2	0.0009	0.0022*
	(1.33)	(2.27)
CORPOR	0.0003	0.0020
	(0.31)	(1.47)
SMALL	–0.0016	0.0022
	(–1.28)	(1.38)
FARM	0.0019	0.0037*
	(1.49)	(2.42)
GDP	–0.1316**	–0.0014
	(–5.18)	(–0.07)
RATE	0.8151**	–0.6825
	(3.78)	(–1.27)
RATE2	–3.0804**	2.2947
	(–3.55)	(1.11)
FARMING	–0.0002**	–0.0001
	(–2.92)	(–1.31)
DEPO/POPULA	–0.0033**	–0.0007
	(–2.99)	(–0.44)
MARKET SHARE	–0.0016*	–0.0026*
	(–2.22)	(–2.32)
DOZEN	0.0015*	0.0026**
	(2.24)	(2.59)
GROUP35	0.0012	–0.0015
	(1.31)	(–1.21)
NOBS	1152	662
$\bar{R}^2$	0.2791	0.1738
SEE	0.0093	0.0102

Results are based on SAMPLE2. Period 1 is 1987/01–1990/11 and period 2 1990/12–1992/7. t-statistics are in parentheses. * = significantly different from zero at the 5 % level, ** = significantly different from zero at the 1 % level. NOBS is number of observations. SEE is the standard error of estimate.

Table A2. Subperiod results from logit-analysis when the reference rate is replaced by three month Helibor rate

variable	PERIOD 1	PERIOD 2
constant	−4.1280**	7.2257**
	(−2.56)	(2.82)
COLL1	0.5682*	0.4891
	(2.12)	(1.43)
COLL2	−0.3950	0.6493
	(−0.38)	(0.50)
COLL3	0.9127**	1.2667**
	(4.94)	(5.23)
LONG	−1.1898**	−0.7488**
	(−6.62)	(−2.94)
SIZE	0.7777**	0.9144**
	(8.03)	(7.41)
PART1	1.3303	1.5180
	(1.67)	(1.88)
PART2	1.5949**	1.8240**
	(9.47)	(7.15)
CORPOR	2.2283**	2.2236**
	(8.91)	(6.65)
SMALL	2.2241**	2.6131**
	(6.58)	(6.28)
FARM	2.4858**	2.6431**
	(5.98)	(6.73)
GDP	−0.0547	31.4939**
	(−0.08)	(5.62)
INTEREST	10.2775*	−21.3804*
	(2.48)	(2.41)
FARMING	0.0107	0.0213
	(0.58)	(1.27)
DEPO/POPULA	0.2280	−1.1070**
	(0.76)	(−2.66)
MARKET SHARE	0.1803	−0.4027
	(0.98)	(−1.41)
DOZEN	0.3114	−0.4327
	(1.77)	(−1.68)
GROUP35	−0.0825	0.0861
	(−0.34)	(0.27)
NOBS	1152	662
log (L)	−579.49	−312.94
Number of correct predictions	867	509
(percentage of obser., %)	(75.26)	(76.89)

Results are based on SAMPLE2. Period 1 is 1987/01–1990/11 and period 2 1990/12–1992/7. t-statistics are in parentheses. * = significantly different from zero at the 5 % level, ** = significantly different from zero at the 1 % level. NOBS is the number of observations. Number of correct predictions indicates the number of observations where the estimated likelihood to receive an observed value (0 or 1) is higher than half.



1: under −1 %, 2: (−1, −0.5), 3: (−0.5, 0), 4: (0, 0.5), 5: (0.5, 1), 6: (1, 1.5), 7: (1.5, 2), 8: (2, 2.5), 9: (2.5, 3), 10: (3, 3.5), 11: (3.5, 4), 12: (4, 4.5), 13: (4.5, 5), 14: at least 5 %

Figure A1. Distribution of loan rate premia