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The views expressed in the paper are those of the authors and do not necessarily represent the views of the Bank of Finland.

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Abstract

The paper examines the role of bank relationships in business closures during the Finnish economic crisis of the early 1990s. We utilise a unique panel data set of 474 small and medium-sized firms, for which we have standard accounting information and for which we can in addition identify whether the firm had a lending relationship with the most troubled part of the banking system, namely the Savings Bank of Finland and Skopbank. By estimating a logit model we find that, even accounting for the effects of liquidity, profitability, indebtedness, age and size, firms that had a lending relationship with the savings banks concerned were more likely to close in 1992 than other firms that year or the same firms in other years. Thus being a loan customer of these banks entailed greater risk for firms than having a lending relationship with other intermediaries only in 1992, which was the year the banking sector came to a head. The result lends support to the hypothesis that financial factors affect real outcomes not only through firm and household balance sheets but also through bank behaviour.

Key words: financial factors, credit crunch, banking crisis

Pankkisuhde ja pienyritysten toiminnan lopettaminen Suomen 1990-luvun lamassa

Suomen Pankin keskustelualoitteita 13/99

Helvi Kinnunen – Vesa Vihriälä
Kansantalousosasto

Tiivistelmä

Tutkimuksessa tarkastellaan pankkisuhteen vaikutusta yritysten toiminnan lopettamiseen Suomen 1990-luvun alun lamassa. Tutkimus perustuu ainutlaatuisen aineistoon 474 pienestä ja keskisuuresta yrityksestä. Tavanomaisen kirjanpitoinformaation lisäksi aineiston avulla on mahdollista määrittää, oliko yrityksellä luottoasiakassuhde suurimmissa vaikeuksissa olleeseen osaan pankkisektoria eli Suomen Säästöpankkiin (SSP tai sen edeltäjät) tai Suomen Säästöpankkien Keskuspankkiin (Skop). Estimoimamme logit-mallin mukaan yritykset, joilla oli tällainen asiakassuhde, lopettivat toimintansa todennäköisemmin kuin muut yritykset vuonna 1992 taikka todennäköisemmin kuin samat yritykset muina vuosina, vaikka otetaan huomioon yritysten erilaiset likviditeetti-, kannattavuus- ja velkaantuneisuustilanteet sekä yritysten ikä ja koko. Asiakkuus SSP:ssä ja Skopissa oli siten pankkikriisin pahimpana vuonna riskialttiimpaa kuin velkasuhde muihin pankkeihin. Tulos tukee hypoteesia, että ns. rahoitustekijät vaikuttavat reaalityöelämän kehitykseen paitsi yritysten ja kotitalouksien taseiden kautta myös pankkien käyttäytymisen välityksellä.

Asiasanat: rahoitustekijät, luottolama, pankkikriisi

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1 Introduction

The recent financial crises in Japan and elsewhere in Asia have once again highlighted the role of financial intermediation in macroeconomics. A widely held view is that frictions in financial intermediation tend to increase in times of general economic downturn and that these frictions contribute to a further decline in economic activity by leading to reduced spending and business closures.

Theoretical literature identifies two mechanisms through which financial intermediation may affect real outcomes, ie production and employment. The first can be called a balance sheet mechanism and the second a (bank) lending mechanism. Both of them are associated with problems created by asymmetric information between providers of external funding and those making use of such funding; see for example Holmström and Tirole (1997) and Bernanke, Gertler and Gilchrist (1998).

According to the basic financial factor view, firms and households taking spending decisions are faced with external finance premiums, which in the extreme case may be infinite so that external financing is not available at any price. The premium is likely to be the bigger the weaker the potential borrower's balance sheet, ie the smaller net worth is. The more expensive external funding is or the less readily available it is the more spending depends on liquidity, ie cash flow and the stock of liquid assets. In the extreme case, problems with external funding may force a firm into bankruptcy or to terminate its operations, in some other way. As balance sheets are typically better when economic conditions are good, a “financial accelerator” emerges.

This mechanism exists quite independently of any financial intermediaries. However, in modern economies banks and other financial intermediaries play a central role in channelling funds from savers to ultimate spenders. Yet these intermediaries may also be plagued by external finance premiums in which case another financial accelerator may emerge. Weak bank capital or net worth in particular may lead to a contraction of bank credit, “credit crunch”. The credit supply behaviour of intermediaries may thus exacerbate the negative effects on spending caused by weak firm and household balance sheets.

Distinguishing between the two mechanisms is inherently very difficult. Nevertheless it would be highly desirable. If bank behaviour matters, pursuing the right banking policies – prudential regulation, supervision, bank support – is an important question. However, if only the balance sheet mechanism (of non-financial firms) is important, then, for example, bank support may not be very useful, and the main focus should therefore be on designing appropriate macro-economic policies.

Many of the countries which have experienced severe recessions in the 1990s have gone through financial crises in the form of wide-spread financial difficulties among firms and households and a major deterioration in profitability and capital adequacy in the banking sector. Bankruptcies of non-financial enterprises have soared and in many cases major bank failures have taken place. At the same time credit stocks of financial intermediaries have declined substantially. At first glance these observations are consistent with the view that “financial factors” have made a major contribution to the recessions.

A large body of empirical research has emerged on the effects of these financial factors. The importance of firm balance sheets and cash flow factors

seems to have been well established, irrespective of which country or particular time period is considered. Similarly, several studies have found strong evidence for the contribution of financial constraints on household spending. Some of the studies are surveyed in Hubbard (1998) and Bacchetta and Gerlach (1997).

Studies have also provided some evidence in support of a distinct role for financial intermediaries. Several studies, spearheaded by Bernanke and Lown (1991), suggest that weak bank capital leads to a credit crunch. The results of these studies are not altogether consistent or convincing, however. As noted by Sharpe (1995) with regard to the American credit crunch studies, the conclusions may be distorted by several methodological problems. These relate, in particular, to the difficulty of separating the effects of borrower quality and bank's lending behaviour.

In times of financial crisis both factors point in the same direction. Firms' profitability and households' income prospects are weak and indebtedness typically high, implying weak borrower quality. But at the same time bank capital has typically been squeezed by credit losses or provisions for such losses. In order to shed light on the importance of bank behaviour, we need to be able to account for the effect of borrower quality. In typical credit crunch studies this is not the case, owing to difficulties in obtaining relevant data.

Some studies have nevertheless combined information on borrowers with that on lenders. One line of research has studied the effect of bank relationships or bank characteristics on loan pricing. Hubbard, Kuttner and Palia (1999) report results for a large American data set which suggest that it is more costly to borrow from a low-capital bank than from other banks, even after controlling for borrower characteristics.

Other studies have focused on real effects of the bank relationship. Thus Gibson (1995), using Japanese data finds that a firm's investment depends on the financial health of the firm's main bank. On the other hand, Vale (1995) reports that inventory investment by Norwegian firms was unaffected by whether or not the firm had a relationship with a "problem bank" during the Norwegian banking crisis of the late 1980s.

This paper focuses on the effects of financial factors on small-business closures during the Finnish financial crisis of 1991–1993. Using a new set of panel data, we examine the question of to what extent bank relationship, in addition to firm characteristics, explains the likelihood that a firm discontinued its operations during these crisis years. Like Vale, we define problem banks on an a priori basis and examine whether closure probabilities for firms with a relationship with the problem banks are different from those with no such relationship.

We aim at two contributions. First, by analysing simultaneously the roles of firm characteristics and bank relationships in business closures during perhaps the deepest recession experienced by developed market economies since the 1930s, we hope to provide some additional evidence of the importance of bank behaviour for real outcomes in general. Second, we hope to shed some light onto the fiercely debated but little researched question of whether savings bank customers were treated differently from other borrowers during Finnish banking crisis.

The paper is organised as follows. Section 2 provides a brief description of the Finnish boom-bust period of the late 1980s and early 1990s. Section 3 discusses the available evidence concerning the role of financial factors in generating and bursting the bubble. In Section 4 we spell out more closely the

hypothesis we want to test. In Section 5 we describe the data and the equation to be estimated and report the estimation results. Finally, we discuss the results briefly in section 6.

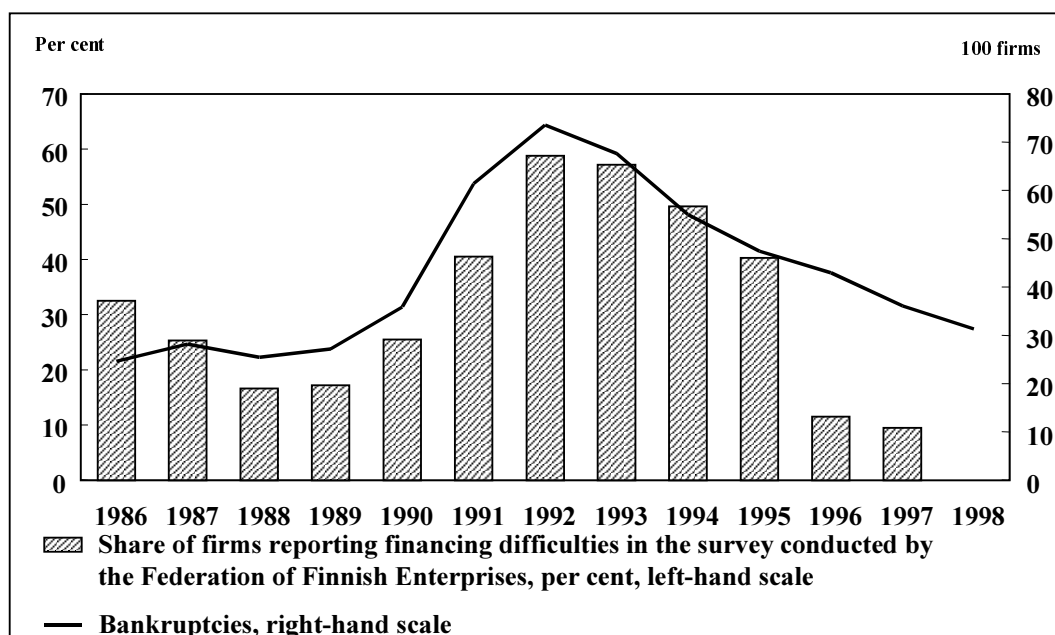
2 The boom-bust period in brief

The Finnish boom-bust period of the late 1980s and early 1990s resembles in many ways the experiences of other developed countries that liberalised their financial markets in the 1980s and in many Asian countries more recently. The amplitude of the cycle was, however, larger than in any other developed market economy.

Liberalisation was followed by an unprecedented boom, which, apart from strong output growth, was characterized by a rapid increase in bank lending, and firm and household indebtedness and by a steep rise in asset prices. At a mature stage of the growth period, monetary policy was tightened and a little later the economy was hit by major negative external shocks. The fixed exchange rate regime came under strong pressures, leading to high interest rates and eventually to a substantial depreciation of the currency.

In the three-year period 1991–1993, total output declined by some 12 per cent, unemployment rose from less than 4 per cent to almost 20 per cent of the labour force, stock prices fell by two-thirds and prices of dwellings – the main household asset – halved. Debt service difficulties mounted, an ever-increasing share of banks’ outstanding credits became non-performing, and the number of bankruptcies multiplied (Figure 1).

Figure 1. **Reported financing difficulties and bankruptcies**



Finnish banks experienced growing solvency and liquidity difficulties. As early as September 1991 a major commercial bank, Skopbank, failed. This bank, which also functioned as a “central bank” for some 80 savings banks, was taken over by the Bank of Finland, the Finnish central bank. The solvency of the savings bank as a group also weakened rapidly. In June 1992 some 40 – mainly large – savings banks were merged to form the Savings Bank of Finland (SBF). In September 1992 its capital was written off and it was converted into a limited liability company under government ownership. Later the same year a smaller commercial bank failed; the responsibility for its non-performing assets was taken over by the government and the sound assets were sold to a private bank. In the autumn of 1993 the sound assets of SBF were sold to four Finnish banks.

The government guaranteed that the failing banks could continue to honour their commitments. It also provided other banks with capital support. In the early 1993 Parliament even approved a resolution stating that the state would guarantee that the Finnish deposit banks would meet their contractual commitments. One of the main aims of the government’s bank support measures was to avoid that the difficulties of the banking system would lead to a generalised “credit crunch”.

Despite bank support commitments amounting to over FIM 80 billion or some 16 per cent of annual GDP, banks’ credit stocks continued to decline. Not even the recovery of GDP growth that started in late 1993 led to any increase in lending before 1997. In the public discussion the banks were blamed for refusing to finance healthy firms and even for forcing small businesses into bankruptcy on a large scale without any solid reasons. The savings banks, in particular, were seen by many as being aggressive in forcing firms into bankruptcy.

3 What is known about the role of financial factors in the Finnish boom-bust cycle?

The patterns displayed by developments in key macroeconomic variables are consistent with the operation of a financial accelerator in the Finnish boom-bust cycle. Furthermore, several studies have produced econometric evidence supporting the hypothesis that borrower balance sheets played a central role in the cycle.

Using panel data, Brunila (1994) finds that firms’ investment in fixed assets was affected negatively by indebtedness and positively by cash flow over a time horizon covering major parts of the overheating and subsequent crisis periods. Honkapohja and Koskela (1999) find with similar panel data that investment is much more sensitive to cash flow for firms that were classified financially constrained a priori. These findings are also consistent with time series results obtained by Kajanoja (1995).

Honkapohja and Koskela also provide other important evidence on the role of financial factors. First, they find time series evidence of strong effects of wealth and liquidity variables on private consumption. Secondly, their time series results for wage and price equations suggest that wage setting and pricing were also affected by indebtedness.

However, the role of financial intermediaries in generating the boom-bust cycle is more ambiguous. On the assumption that shocks to banks’ credit stocks are determined by supply rather than demand, one can in principle trace the effect

of credit supply on, for example, investment. This is done by Saarenheimo (1995) in an aggregative VAR model consisting of bank loans, money, the loan rate and fixed investment.

Saarenheimo's results suggest that new additions to credit stocks accounted for most of the approximate one-third increase in the level of private fixed investment between 1987 and 1990. Similarly, in the crisis period, investment would have been higher had there not been shocks to credit – although not by, as large a margin as it would have been lower in the boom period. However, distinguishing between supply and demand factors is very difficult in the pure time series framework used by Saarenheimo. The same criticism applies to the aggregate time series analysis by Pazarbasioglu (1997), who also reports results consistent with a credit crunch.

Vihriälä (1997) examines in detail local banks' (savings banks and cooperative banks) credit supply in both the boom period and the early years of the crisis (1991–1992). The analysis, which uses panel data on several hundred banks, shows that savings banks which were weak in terms of capital and costs were much more aggressive in expanding lending than other banks in the boom years, even after controlling for demand factors. This distorted supply behaviour, interpreted as stemming from moral hazard, accounted for all the difference in credit growth between the savings banks (as an aggregate) and the cooperative banks (as an aggregate). As rapid credit growth was a major explanatory factor of asset quality in the crisis years (see Soltila and Vihriälä (1994)), distorted incentives also explain why the savings banks encountered far bigger capital problems in the early 1990s.¹

On the other hand, the evidence on the role of banks' supply behaviour during the crisis years is more ambiguous. There is no evidence that bank capital restrained lending, ie that there had been a "credit crunch" because of a shortage of capital. Instead, the evidence suggests that, particularly among the savings banks, weak asset quality as measured by the share of non-performing assets had a strong negative effect on lending. Both these effects are furthermore stronger in 1992 than in 1991.

Taken at face value, the strong negative effect of non-performing assets but no effect whatsoever on the past of bank capital suggests that borrower quality rather than the bank characteristics was the important thing in determining lending.² However, the fact that the effect of non-performing assets is stronger for

¹ Murto (1996) examines the pricing of savings bank credit in the late 1980s using data on individual loan customers. He finds that typically loan rates were not affected by all the available information on customer quality, which plausibly should reflect credit risk and which ex post was found to be associated with credit risk.

² Interpreting the role of non-performing assets (npa) is problematic. Banks tend to have long-term customer relationships and this is likely to be particularly true in times of financial distress, when adverse selection problems multiply. Thus a bank that has a high ratio of npas to total loans is likely to have a weak average quality (creditworthiness) among its potential borrowers. In this sense npa's proxy for borrower quality. On the other hand, as long as no provisions have been made for the potential losses associated with npas, a high npa ratio also implies that the book value of bank capital is overstated. Thus a high npa ratio may also signal weak bank capital and is therefore a characteristic of the bank rather than its customers. However, if this latter interpretation is correct one would expect that, when high npas have a negative effect on bank credit, the book value of bank capital should have a positive effect on bank lending ("credit crunch" hypothesis") or vice versa ("moral hazard" hypothesis). Given that capital has no effect whatsoever, it seems reasonable to interpret the npa ratio as standing primarily for customer quality.

the savings banks and stronger among them in 1992 than in 1991 also suggests that the savings banks collectively pursued more restrictive lending policies than other banks, particularly in 1992.

The possibility that the savings banks had behaved differently from other banks in 1992 is quite plausible. As noted above, the savings bank group was in serious trouble in 1992. The “central bank” of the savings banks had been taken over by the authorities the previous autumn after having lost all of its equity capital. A large number of savings banks – which combined to form the SBF in June – struggled to remain in business without being taken over by the government. This nevertheless eventually happened in September. After the take-over, the question was whether the bank could remain an independent bank in government ownership (to be privatised later) or whether it should be liquidated. It is quite possible that in both stages the savings banks’ behaviour towards their loan customers was strongly affected by the struggle to survive.

4 The question to be asked

This paper seeks to add to our understanding of the role of banks in the Finnish financial crisis by examining how a borrowing relationship with the most troubled part of the banking system, ie Skopbank and the SBF, affected the likelihood of small-business closures (termination of operations) in the period 1991–1993 after controlling for the effects of some key firm characteristics and time effects.³

A firm may cease to exist in many ways. It can go bankrupt, it may be merged with another firm or it can otherwise be wound down. All of these involve reallocation of resources, which may enhance efficiency, at least in the longer run. However, in the short run they involve adjustment costs and may lead to temporary under-utilisation of resources. The outcome is likely to depend on both the form closure takes and the reasons for it. Bankruptcy probably involves more adjustment costs than other forms of closure. Similarly, the negative effects are likely to be relatively greater, if closure is due to by factors which have little to do with the firm’s underlying profitability, such as financial problems of the lending bank.

We examine closures in general rather than bankruptcies alone for two reasons. First, we believe that at least in a severe economic recession all types of closure contribute to the short-run contraction in economic activity. Secondly, and more importantly, the data we use do not allow us to identify with certainty which firms went bankrupt and which terminated operations for some other reason. Furthermore, the bankruptcy indicator contained in the data set is available for only some of the years we are interested in.

A firm’s bank relationship has a bearing most immediately on firm liquidity. A decision by a “house bank”, ie a bank that has traditionally lent to the firm, not

³ In principle we could consider SBF and Skopbank separately. However, statistical analysis becomes more uncertain with a smaller number of positive bank relationship cases. Some experiments show that qualitatively the same results obtain for the SBF relationship as for the SBF and Skopbank relationship, but the findings are in that case more uncertain.

to provide short-term financing can easily lead to a liquidity bankruptcy.⁴ Other banks and financial intermediaries are unlikely to start financing such a firm, particularly at a time of general financial distress. Adverse selection problems are all too obvious.

But the financial weakness of a traditional lender can lead to other types of closures apart from bankruptcy. The poorer availability of finance (say because of stricter collateral requirements) may prompt a firm to close down because the investment necessary for the successful continuation of its business cannot be made. Similarly, a merger with a stronger company may become an attractive or the only alternative if the house bank does not provide adequate finance.

As noted above, the standard asymmetric information argument about the role of a bank's balance sheet suggests that most savings banks pursued a stricter credit supply policy than other banks in the crisis years of 1991–1993. In particular, this theory predicts that these banks would have been more inclined than other banks to cut losses and reduce risks by terminating customer relationships with risky loan customers, including through bankruptcy if necessary.

This inclination, brought about by the financial distress of the savings banks group, may have been reinforced by the reorganisation of the group in two rather different ways. First, the authorities may have required a more rapid reduction in risks in Skopbank and SBF and its predecessor banks than in other banks that were not under special surveillance and later taken over by the government.

Second, when the SBF was established it was quite clear that the government would not allow the bank to fail but would instead provide as much capital support as was needed to keep the bank operating, at least in the short run. This may have created an incentive for the new management to pursue a very aggressive policy of risk reduction irrespective of the demands of the authorities: in contrast to other banks capital sufficiency would not have constrained the writing off of questionable loans.

Focusing on the SBF and Skopbank means in effect that we consider the remaining banks in the savings bank group – some 40 mainly very small banks – to be quite different from the rest of the group. We feel this is justified on two counts. First, as individual banks they were in general in a very sound financial position. Second, the authorities decided quite early on in the financial crisis to limit the responsibility of these banks for the losses of the savings bank group in a way which kept their solvency intact.⁵

⁴ Bankruptcies are typically classified as solvency bankruptcies and liquidity bankruptcies. In the former, firm's net worth becomes negative because of incurred or pending losses. Depending on the jurisdiction, the formal criteria for bankruptcy vary. The Finnish legislation requires a firm to go into liquidation when stockholders' equity falls below one-third of stock capital. Liquidity bankruptcy occurs when a firm fails to pay its debts when they fall due. This may be due to shortage of cash or readily marketable assets or the unavailability of credit.

Of course, distinguishing between solvency and liquidity bankruptcies is very difficult both conceptually and in practice. Liquidity problems are likely to emerge when there are doubts about solvency, and weak liquidity may, in turn, worsen solvency significantly through high risk premiums contained in the interest rates on the firm's debt.

⁵ In principle, all the savings banks had an unlimited mutual responsibility through the security fund of the banking group. Thus, without an explicit decision by the authorities, the capital of the small savings banks would have been wiped out through this responsibility.

The key aspect of our analysis is that we combine data on firm characteristics with information on bank relationships so as to be able to better distinguish between the effects of borrower quality and lender behaviour than in previous studies on the subject.

As far as we know, no Finnish study has examined the proximate reasons for business closures in periods embracing the economic crisis of the early 1990s. Some studies, starting with Prihti (1975), have been made on forecasting bankruptcies on the basis of various accounting ratios; see eg Laitinen and Kankaanpää (1997). However, the data used in these studies do not cover the crisis years we are interested in. And, in particular, no attempt has been made in these studies to take into account the role of bank relationships.

5 Empirical analysis

5.1 Data and the set-up

The nature of the empirical analysis is largely determined by the availability of data. We utilise a unique data set compiled by the Government Guarantee Board (Valtiontakuu keskus or VTK). The data set contains standard balance sheet and income statement information and some information on financial contracts of 474 small and medium-sized firms which existed at the end of 1988. The data are annual and cover the years 1989 and 1990 as well as the crisis period 1991–1993.

It is important to note here that, even though the VTK provided guarantees for loans to small businesses, it did not usually assume all of the associated credit risk. First, the guarantee contract usually allocated some of the credit risk to the lender for the loans in question. Secondly, firms which obtained a VTK guarantee for a loan often had other – unguaranteed – loans from the lender. Thus for the lending bank there was usually at least some credit risk associated with the customer relationship.

As noted above, a key feature of our data set is that we can identify, which of the guaranteed loans were supplied by Skopbank, the banks which combined to form the SBF in 1992 or some other bank. We define every firm with a loan from SBF banks or Skopbank as having a customer relationship with these banks (“SB firms”), while firms having no such loans are defined as non-SB firms.⁶

Thus, the 474 firms which were established prior to the peak boom year of 1989, 270 terminated their operations because of bankruptcy or some other reason by the end of 1993. Closures were noticeably more frequent among the firms with a SBF/Skopbank relationship. The difference stems solely from the year 1992 (see Table 1). In that year, almost 40 per cent of existing savings bank firms terminated operation while for other firms closures amounted to less than 20 per cent.

⁶ Obviously, a firm may have been a loan customer of the SBF banks or Skopbank even if it did not have any loans from these banks guaranteed by the VTK. In that sense our list of SBF/Skopbank firms is incomplete. To the extent this creates a bias in the sample, it is likely to be in the direction of not finding a difference between firms having and not having a registered SB relationship

The difference suggests that the SBF or Skopbank pursued a different closure policy from the other banks during this crisis year. But this is not the only explanation. There is ample evidence that the difference could also be explained by the fact that firms with a SBF/Skopbank relationship were, on average, worse credit risks.⁷ Therefore controlling for borrower quality is a necessary condition for making valid inference about the role of the bank relationship.

Table 1. **Number of firms and closures in the data set**

	Existing firms			Closures					
	Total	SBF/ Skopbank	Other	Total		SBF/Skopbank		Other	
				Number	%	Number	%	Number	%
1989	474	71	403	27	5.7	2	2.8	25	6.2
1990	447	69	378	63	14	11	15.9	52	13.7
1991	384	57	327	68	17.7	10	17.5	58	17.7
1992	316	47	269	87	27.5	18	38.3	47	17.4
1993	229	29	200	25	10.9	3	10.3	22	11

The empirical analysis is based on a logit model, according to which the probability of closure the firm y_i depends on firm characteristics and the bank relationship as follows:

$$(1) \quad P_r\{y_i = 1 \mid x_i\beta\} = e^{x_i\beta}/(1+e^{x_i\beta}),$$

where $x_i\beta$ is a linear function of variables assumed to affect firm closure. In vector x we include various firm characteristics and other relevant variables.

The bankruptcy literature usually identifies three types of firm characteristics that are assumed to increase the likelihood of bankruptcy: weak liquidity as measured by some liquidity ratio; weak current profitability measured by, for example, operating income; and weak solidity measured typically by indebtedness.

We follow this tradition but add some other variables allowed by the data. We measure liquidity by the current ratio LIQ, which is the ratio of financial assets to short-term debt. Current profitability is measured by the ratio of operating income to turnover OPROF. Indebtedness is measured by the ratio of total interest-bearing liabilities to total assets DEBT.

In the case of non-financial firms operating income reflects mainly the profitability of the business as such rather than the current profitability of the firm, since interest expenses and other financing costs as well as such earnings are excluded. To capture the potentially different effects of financing costs, we also include in the model a variable – INTEXP – which is the ratio of net interest expenses to turnover.

The data set also allows controlling for a couple of other potentially significant firm characteristics. Thus we include the age of the firm as measured by the number of years since establishment (AGE). The hypothesis is that the longer the firm has existed the stronger is its reputation for paying back its debts and thus the better its creditworthiness.

⁷ Customer quality was clearly worse in the case of the savings bank group than for other banks at the onset of the financial crisis; see eg Solttila and Vihriälä (1994).

Similarly, we expect larger firms to be better known by lenders and thus to constitute a smaller risk. Smaller adverse selection problems allow these firms to obtain external finance more easily from various sources and make them less likely to close because of financial distress. The variable SIZE is defined as the log of turnover.

Prevailing economic conditions may affect firm closures over and above the impact on firms' current profitability and balance sheets, as future business prospects are likely to be assessed on the basis of general economic conditions. We take economic conditions into account by including time dummies (taking the first crisis year 1991 as a benchmark) in the model.

The bank relationship enters the model as a dummy variable. SBDUM obtains the value 1 when the firm has a VTK-guaranteed loan supplied by either the SBF (or its predecessor banks) or Skopbank. To allow for the relationship to have a time-dependent effect, we also construct the dummy variables SB89, SB90, SB91, SB92 and SB93 in such a way that, for example, SB91 is equal to unity for the 1991 observations of the firms that have a banking relationship with the SBF or Skopbank and zero for all other observations. The means of the explanatory variables for the most interesting year 1992 are displayed in Table 2.

Table 2. **The means of the explanatory variables for 1992**

	All firms	Closed firms	SB firms
LIQ	1.2	1.1	1.3
OPROF	5.4	0.1	4.6
DEBT	122.5	136	126.9
INTEXP	9.5	11.3	10.8
AGE	14.3	13.9	14.8
SIZE	8.5	6.3	8.6

The average characteristics of SB firms in our data differed only a little from those of all firms, although operating profit was somewhat weaker and indebtedness and interest expenses somewhat higher. In contrast, those firms that terminated their operations were, on average, considerably worse off in all these respects than firms on average. These observations suggest that firm characteristics other than bank relationship were probably quite important in influencing closure, but cannot explain the difference between SB firms and other firms. Yet the importance of the bank relationship can only be determined by allowing all the factors to have an impact simultaneously. This is what we do next.

5.2 The results

The estimation results are presented in Table 3. Instead of coefficients we report the marginal effects of each variable assuming that the variables obtain the average value in the sample.

We first examine a very basic formulation containing just firm characteristics and the dummy for the bank relationship. The results for this version, which does not allow any differences in behaviour over time, are shown in column A. All the signs of the effects are according to expectations. However, only liquidity and size display impacts on the likelihood of closure that are statistically significant at the standard significance levels. The bank relationship does not appear to have any importance for closures. Furthermore, although some 85 per cent of all cases are correctly classified, the model picks up only 2 of the 270 closures.

The poor performance of the basic version may at least partly be due to the rapidly changing economic conditions. In the late 1980s, economic growth was strong and firms' prospects were in general considered to be good. Furthermore, there is a large body of evidence that suggests that banks did not pay very much attention to credit risks at the time. Thus it is possible that prior to the recession, closures were not determined by financial conditions to the extent that they were later and – by definition – random factors played a relatively more important role in our model.

Secondly, our discussion above suggests that the reasons for hypothesising about a specific savings bank effect relate to the crisis years, and in particular to 1992. The data displayed in Table 1 furthermore show that closures of SB firms were much more frequent in relative terms in 1992 than in any other year. Thus the role of the bank relationship is also likely to vary over time. As noted, we allow for this by using separate SB dummies for all the years considered. The results are reported in Column B of Table 3.

They show that the probability of closure does in fact vary a great deal over the years in question even after controlling for firm characteristics. Thus, relative to the benchmark year 1991 – the first crisis year – closures were significantly less frequent in 1989, in particular, but also in 1990 and 1993. Even taking into account firm characteristics, firms were more likely to close in 1992 than in other years.

A very interesting change concerns the bank variable. SB92 obtains a positive coefficient with a marginal significance level of 6 per cent. Thus even after controlling for firm characteristics and the fact that 1992 was a more difficult year than others in terms of general economic conditions, firms with a SBF or Skopbank relationship appear to have been more likely to close in 1992 than firms with no such relationship or than the same firms in other years.

Including the time dummies does not change the results to any noteworthy extent. Liquidity and size remain significant variables, although the former effect is now substantially smaller. In addition, interest expenses become significant at the 10 per cent level. On the other hand, despite some improvement, the model still performs poorly in picking up individual closures.

The importance of time dummies suggests allowing for more time dependency of the estimated relationship. Estimating the model for individual years and sub-periods suggests that the last three years covering the crisis period proper form a distinct group of observations compared with 1989 (rapid growth)

and 1990 (stagnating production). We thus report the results for this shorter period in Column C of Table 3.

Considering the crisis years only sharpens the results in certain respects. The significance of liquidity and, in particular, profitability of closures appears much stronger during the crisis than in our sample period on average. On the other hand, removing the early observations increases the marginal effect of the bank variable on closure probability for 1992 while the significance level remains essentially unchanged.

Although the shorter time period makes the model perform somewhat better in picking up actual closures, the model nevertheless still performs poorly in this regard. One plausible explanation is that our dependent variable classifies as closed businesses cases where termination of operations is more or less voluntary and is not caused primarily by factors that are largely connected with the firm's current financial health or bank relationship. As noted earlier, this problem is difficult to overcome in our data set.⁸

To the extent that the rather poor classification performance stems from a noisy dependent variable, it should not invalidate our qualitative conclusions. The qualitative effects of the various factors revealed by the model should be correct, although probably weaker than would be the case if the model incorporated a dependent variable that excluded all "voluntary" business closure. Furthermore, as regards the savings bank effect, the result may be biased towards not finding an impact, see footnote 6.

Thus we feel that we can argue that the firms with a bank relationship with connection to the Savings Bank of Finland or Skopbank were more likely to terminate operations in 1992 than other firms in that year or than saving bank firms at other times. In quantitative terms, having a loan relationship with the SBF or Skopbank increased the probability of closure by 10 per cent according to our model.⁹ Thus the loan relationship accounts for about half of the some 21 percentage point difference between the overall closure probabilities for SB and non-SB firms in 1992 displayed in Table 1.

⁸ The only practical alternative is to use as the dependent variable the bankruptcy indicator which is available for the period from 1991 to 1993. We conducted such an exercise. As might be expected given the unreliability of the bankruptcy information, the fit is even worse. In particular, only 3 or less than 5 per cent, of the 66 recorded bankruptcy cases are picked up, while in equation C in Table 3 almost 10 per cent of the 170 closure cases are correctly classified by the model.

⁹ The marginal effect is computed as the difference of the cumulative distribution function with SBD92 obtaining the values unity and zero, respectively, with all continuous variables at the sample averages.

Table 3

Logit models for the probability of closure

A. Period 1989–1993

	(a) $\frac{\partial F(x)}{\partial x}$	(b) Std. Error	(c) $z=a/b$	(d) significance level
LIQ	-0.039667	0.012595	-3.15	0.002
DPROF	-0.000093	0.000209	-0.44	0.657
DEBT	-0.000065	0.000125	0.52	0.605
INTEXP	0.000770	0.000542	1.42	0.155
AGE	-0.000049	0.000038	-1.29	0.198
SIZE	-0.021133	0.002851	-7.41	0.000

Number of observations 1850
 Log likelihood function -758.0875
 Restricted log likelihood -768.8822
 Chi-squared 21.58934
 Degrees of freedom 5
 Significance level 0.0006265650
 Correct predictions 85 %

Frequencies of actual & predicted outcomes
 Predicted outcome has maximum probability.

Actual	Predicted		TOTAL
	0	1	
0	1577	3	1580
1	268	2	270
TOTAL	1845	5	1850

B. Period 1989–1993

	(a) $\frac{\partial F(x)}{\partial x}$	(b) Std. Error	(c) $z=a/b$	(d) significance level
LIQ	-0.024757	0.011412	-2.16	0.030
OPROF	-0.000183	0.000189	-0.97	0.333
DEBT	0.000082	0.000118	0.71	0.480
INTEXP	0.000789	0.000480	1.65	0.099
AGE	-0.000046	0.000035	-1.31	0.191
SIZE	-0.016927	0.002770	-5.98	0.000
DSB89	-0.080983	0.080280	-1.01	0.313
DSB90	0.017974	0.039318	0.46	0.648
DSB91	-0.010000	0.041000	-0.25	0.806
DSB92	-0.066857	0.036237	1.84	0.065
DSB93	0.078935	0.070479	-0.12	0.910
D89	-0.146110	0.025443	-5.67	0.000
D90	-0.038047	0.021359	-1.79	0.074
D92	0.039376	0.020810	1.76	0.078
D93	-0.073745	0.028465	-2.59	0.010

Multinomial Logit Model

Maximum Likelihood Estimates

Number of observations	1850
Iterations completed	7
Log likelihood function	-713.3335
Restricted log likelihood	-768.8822
Chi-squared	111.0973
Degrees of freedom	13
Significance level	0.0000000
Correct predictions	86 %

Frequencies of actual & predicted outcomes

Predicted outcome has maximum probability.

	Predicted		
Actual	0	1	TOTAL
0	1577	3	1580
1	265	5	270
TOTAL	1842	8	1850

C. Period 1991–1993

	(a) $\frac{\partial F(x)}{\partial x}$	(b) Std. Error	(c) $z=a/b$	(d) significance level
LIQ	-0.070087	0.022237	-3.15	0.002
OPROF	-0.002920	0.000791	-3.69	0.000
DEBT	0.000036	0.000212	0.17	0.867
INTEXP	0.002452	0.001639	1.50	0.135
AGE	0.000482	0.001033	0.47	0.640
SIZE	-0.017109	0.005220	-3.28	0.001
DSB91	-0.025702	0.056353	-0.46	0.648
DSB92	0.092058	0.049751	1.85	0.064
DSB93	-0.014785	0.095782	-0.15	0.877
D92	0.045393	0.029665	1.53	0.126
D93	-0.104650	0.039433	-2.65	0.008

Multinomial Logit Model

Maximum Likelihood Estimates

Number of observations	929
Iterations completed	5
Log likelihood function	-425.1254
Restricted log likelihood	-456.7193
Chi-squared	63.18786
Degrees of freedom	10
Significance level	0.0000000
Correct predictions	81 %

Frequencies of actual & predicted outcomes
 Predicted outcome has maximum probability.

Actual	Predicted		TOTAL
	0	1	
0	742	7	749
1	166	14	180
TOTAL	908	21	929

6 Discussion

Our analysis of a unique data set of 474 firms over a five-year period suggests that a bank relationship mattered for business closures during Finland's economic crisis in the early 1990s. In particular, firms that had a lending relationship with the Savings Bank of Finland (or its predecessor banks) or Skopbank were more likely to terminate operations in 1992 than other firms or the same firms in the preceding years or in 1993. The result holds even after controlling for the – a priori – most important firm characteristics such as liquidity, profitability, indebtedness, age and size. The result also holds when accounting separately (through the inclusion of a time dummy) for the fact that 1992 was the deepest year of recession.

Interestingly, a bank relationship seems to have been important only in 1992, and not even in the other two crisis years 1991 and 1993. Even so, the savings bank group also experienced significant profitability and solvency problems in 1991 (Skopbank was taken over by the Bank of Finland in September 1991) and 1993 (the Loss-making Savings Bank of Finland was split up and sold to competitors in October 1993).

The finding suggests that the reorganisation of the savings bank group – which effectively started in 1992 with the formation of the SBF – may have contributed to business closures in 1992. But whether this really was the case, and if so, whether it was due to a pressure from the authorities to reduce risks aggressively or to an autonomous decision bank management to shed even slightly risky customers at the government's expense cannot be resolved on the basis of our analysis. A similar outcome could have emerged even without the particular type of government intervention pursued, given the overwhelming solvency problems of the group in 1992.

In more general terms our results support the conclusion that the difficulties of the banking sector were a distinct and additional factor to the firms' balance sheet problems in contributing to the depth of the Finnish economic crisis in the early 1990s. Our finding thus adds a new element to the micro evidence concerning banks' role in the boom-bust period. As noted above, Vihriälä (1997) found evidence that banks' credit supply behaviour contributed to the rapid growth of credit in the late 1980s but no evidence of a "credit crunch" due to insufficient bank capital in the early 1990s. However, poor borrower quality, as measured by the non-performing loan ratio, was found to reduce lending among the saving banks in 1992, in particular. Our new piece of evidence suggests that at least as a group, the worst hit savings banks pursued a more stringent policy towards their financially weaker borrowers than did other banks in 1992.

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