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Research Department  
2.4.1996

## Theoretical Aspects to the Finnish Credit Cycle

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### Abstract

The paper discusses the possibility that the workings of the financial system contributed to the boom-bust cycle in the Finnish credit market since the mid-1980s. We begin with a review of the most prominent theoretical arguments about the role of "financial factors". Also the main findings of a vast empirical literature are summed up. This is followed by a description of the salient features of the Finnish credit cycle and the associated banking crisis. The evolution of credit stocks and interest rates are then analyzed on a relatively high level of aggregation from the perspective of the theoretical arguments discussed. The main conclusions are: First, changes in the balance sheets of firms and households very likely contributed to both the rapid growth of credit in the late 1980s and its subsequent steep contraction. Second, the observations are also consistent with the conjecture that supply of bank credit very likely increased in the late 1980s and contracted in the early 1990s relative to other sources of credit. Third, some differences observed in the behaviour of different bank groups suggest that moral hazard related to underpriced bank liabilities may have contributed to the growth of lending in the boom period, and problems with capital adequacy may have constrained bank lending in the early 1990s. Stylized facts are consistent with these conjectures. However, to reliably infer about these moral hazard and credit crunch hypotheses, in-depth analysis of bank behaviour with micro data is required. Similarly, ascertaining the role of borrower balance sheets requires analysis of borrowers with different characteristics.

Keywords: credit cycle, financial factors, lending policies, moral hazard, credit crunch

### Tiivistelmä

Paperissa tarkastellaan sitä, aiheuttiko rahoitusjärjestelmän toiminta osaltaan luottojen nopean laajenemisen 1980-luvun jälkipuoliskolla ja sitä seuranneen luottokantojen romahduksen. Aluksi käydään lyhyesti läpi tärkeimmät teoreettiset argumentit "rahoitustekijöiden" merkityksestä. Samalla esitetään tiivistetty arvio rahoitustekijöiden roolia koskevasta laajasta empiirisestä kirjallisuudesta. Sitten seuraa Suomen luottosyklin ja siihen liittyvän pankkikriisin keskeisten piirteiden kuvaus, jonka jälkeen tarkastellaan luottojen ja korkojen kehitystä aggregoidulla tasolla aiemmin esillä olleiden teoreettisten selitysten valossa. Tärkeimmät johtopäätökset ovat: Yritysten ja kotitalouksien taserakenteiden muutoksilla oli varsin todennäköisesti luotonlaajen-

nusta lisäävä vaikutus 1980-luvun lopulla ja vastaavasti sitä supistava vaikutus 1990-luvun alussa. Toiseksi havainnot tukevat myös käsitystä, että pankkien luotontarjonta lisääntyi 1980-luvun lopulla ja supistui 1990-luvun alussa verrattuna muihin luottolähteisiin. Kolmanneksi eräät seikat viittaavat siihen, että pankkien velkojen alihinnoitteluun liittyvä moral hazard -ilmiö on saattanut myötävaikuttaa luotonannon nopeaan kasvuun 1980-luvun lopulla. Vastaavasti pankkien pääomaongelmat ovat voineet rajoittaa luotonantoa 1990-luvun alussa. Karkeat havainnot eivät ole ristiriidassa näiden päätelmien kanssa. Luotettava päättely moral hazardia ja luottolamaa koskevista hypoteeseista edellyttää kuitenkin yksityiskohtaista analyysiä pankkikohtaisella aineistolla. Samoin lainanottajien taseiden merkityksestä varmistuminen edellyttää eri tilanteissa olleiden velallisten käyttäytymisen analyysiä.

Avainsanat: luottosykli, rahoitustekijät, luotonanto, moral hazard, luottolama

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# 1 Introduction

In many developed market economies the latter half of the 1980s was characterized by exceptionally rapid expansion of credit, rise of asset prices and aggregate output to be followed by equally exceptional banking problems and stagnation or fall of credit stocks, asset prices and output and employment. The recovery from the recessions has also been slower than usually has been the case. The most prominent examples of this type of cycle are (parts of) the United States, Japan, Norway, Sweden, Finland. Also in United Kingdom and France similar developments have been observed, although in a lesser degree. In terms of output and employment losses Finland has experienced the most severe recession in the recent history of the OECD countries. Also the banking problems have been among the severest if not the severest.

In public discussion malfunctioning of financial system has often times been made the culprit for both the "overheating" and the exceptional depth and duration of the subsequent recession. "Excessive" growth of credit resulting in "overindebtedness" has been claimed to have caused or at least facilitated a period of unsustainable growth. This was followed by a period of low aggregate demand associated with a voluntary or forced consolidation of balance sheets. Furthermore, "credit crunch" due to capital shortages of the financial intermediaries, "excessive" risk aversion by bank managers or misguided regulatory stringency has been named as a significant contributing factor to the ensued recession and slow recovery. Thus the financial system has been implicated if not as a source of the observed credit cycle, at least as a factor that has strongly contributed to the amplitude of the cycle.

This type of reasoning is by no means new. It had a prominent role in many early analyses of the American Great Depression. Thus Fisher (1933) argued that in all major booms and depressions two factors have been of central importance, "overindebtedness to start with and deflation following soon after". The process of "debt-deflation" ie. the increase in real debt burdens of the borrowers as a result of declining prices, leading to lower spending, lower prices and still higher real debt burdens, was according to Fisher the key factor in the transformation of a downturn into Great Depression.

According to Keynes (1936) investment was largely determined by the "state of confidence", which in turn depended on borrower views on the yields of investment projects and on "the state of credit". By the state of credit he meant the degree of confidence lenders have on the borrowers' capacity to service debt. All these factors were considered highly volatile by Keynes. Later particularly Minsky (eg. 1977) and Kindleberger (1978) have described financial cycles and crises with the help of such psychological concepts as "optimism", "euphoria", "pessimism", which set in motion changes in investment, debt finance, and asset prices, which again feed back to the confidence felt by economic agents. The functioning of the financial system and the credit relationships created are a central part of their explanation of aggregate economic fluctuations, not a passive reflection of more fundamental forces in work. Banks as major suppliers of credit have naturally been identified as sources of instability.

However, this sort of analyses are in stark contrast with most of the macroeconomic theory that has developed since the Second World War. The neoclassical ISLM models that were the mainstream of macroeconomics until the

1970s and still constitute the backbone of undergraduate macroeconomic textbooks allow no role for the financial system with the exception of the creation of medium of exchange, money. The models contain typically only two imperfectly substitutable financial assets, money and bonds. Given the Walras' law, bond market can be suppressed from the analysis. Therefore, the financial system consists effectively of "the money market". Although deposit money may be created by a private banking system, such money is assumed to be a perfect substitute for the base money that is a liability of the government. The role of "inside debt" ie. borrowing by a private agent from another is strictly limited to that of bank deposits. Bank assets are equivalent to government bonds.

In these models, economic fluctuations stem from autonomous changes in demand components or money. Assuming rigidity of prices and wages implies that also real quantities ie. output and employment vary in response to changes in the exogenous variables. The financial system of the model, the money market, determines "the rate of interest" by the interplay of supply of and demand for money. Consequently, the only way this very simple financial system can originate or propagate economic fluctuations relate to the demand for and supply of money.

Notwithstanding the emphasis by Keynes of the instability of the "speculative" element of money demand in response to volatile expectations, the ISLM model builds on a stable demand for money function. Thus cyclical variation of real or nominal quantities is not governed by shocks to money demand.<sup>1</sup> This leaves money supply the only potential financial market variable that can affect aggregate outcomes. If it is assumed that money supply is perfectly controlled by the monetary authority, only policy shocks can move the interest rate and the consequently the demand components depend on the rate of interest. But money supply may not remain stable in the absence of active policy. The empirical counterpart of the ISLM model's money stock consists largely of deposits supplied by private banks. And it is possible that the supply of bank deposits varies independently of monetary policy.

In their detailed account of monetary developments in the United States, Friedman and Schwarz (1963) not only claim that changes in money supply have in a major way affected output but also that banking panics have resulted in significant declines in the deposit component of money stock. This claim implies that even if one abstracts away from all other private debt instruments than bank deposits, the functioning of the financial system can lead to variation in the rate of interest and thereby also in aggregate outcomes. The origin of the effect is banking panics, which may force banks to close down and thereby contract supply of deposits. However, the problem is in principle easy to handle if the monetary authority keeps up the total money supply by increasing the supply of base money. According to Friedman and Schwarz, the failure to maintain sufficient money supply in the face of banking panics was the distinctive factor that translated the recession of the early 1930s into the Great Depression. Extension of credit and a subsequent debt-deflation has no role in the explanation.

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<sup>1</sup> Policy analysis based on the ISLM framework may incorporate a degree of instability of the money demand function in recognition that every theory is only an approximation of "reality". But then the issue is just one of monetary control ie. the need of the monetary authority to know whether a given change in the money stock is a reflection of a change in the arguments of the money demand function, a random flip or perhaps due to a change in the supply of bank money.

This absence of the role of credit is characteristic also for a substantial body of modern theories that seek to explain aggregate economic fluctuations based on explicit optimization behaviour of individual economic agents and rational expectations. The models try to generate plausible patterns of serial correlations and cross-correlations of aggregate variables such as output, employment, price level, real wage etc. in response to shocks to production technology, to preferences, and in some cases to money. Many of these models assume complete markets, perfect competition and fully flexible prices.

Most of the so-called real business cycle models either abstract away from all financial market considerations including money or incorporate a purely passive money ie. a quantity that responds to demand for transactions services.<sup>2</sup> Some, like the monetary business cycle models by Lucas (1972) and Barro (1976) allow money to affect demand while retaining full flexibility of all nominal quantities. The central prediction of these models is that anticipated changes in money do not have any real consequences, while unanticipated shocks to money create temporary movements in output and other real variables. As in practice information about money stock can be assumed good, these models give little scope for monetary shocks to create business cycles. Allowing rigidities in prices or in wages increases possibilities for real consequences of monetary shocks.<sup>3</sup>

However, in the past 10 years or so an increasing number of models aiming at explaining macroeconomic fluctuations have incorporated a financial system much richer than that just producing money. Most of these models give private debt, balance sheet structures and financial intermediaries an important role in magnifying the effects of various shocks so as to lead to potentially substantial aggregate fluctuations. In some analyses even shocks to financial intermediation can precipitate real consequences. In the following sections 2 and 3 these ideas are discussed. Empirical evidence reported in the literature about their significance is briefly reviewed in section 4. Section 5 then provides a description of the salient features of the Finnish boom-bust cycle and preliminary interpretations of the cycle from the point of view of the discussed financial intermediation theories. The interpretations are based on aggregate level behaviour of credit stocks and interest rates augmented with some observations about the evolution of bank lending by different bank groups.

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<sup>2</sup> Examples of models that abstract away all financial elements are Kydland and Prescott (1982) and Long and Plosser (1983). A purely passive money appears in King and Plosser (1984).

<sup>3</sup> Price rigidities are incorporated for example in Fischer (1977) and Taylor (1980) and wage rigidities in Phelps and Taylor (1977).

## 2 Why financial factors may matter: some partial equilibrium arguments

### 2.1 Imperfect information as a source of frictions

In all developed economies there exist substantial amounts of private debt and a large variety of financial instruments, firms' capital structures vary a great deal and the financial system uses non-trivial amounts of resources. Therefore, abstracting away from these facts in macroeconomic analysis is associated with a notion of smooth, frictionless functioning of the financial system.

A prerequisite for the smooth functioning of the financial system is that transactions costs are small relative to the value obtained from financial transacting. Some economists have questioned this. Gurley and Shaw (1955) thus argued essentially on the grounds of transaction costs that the financial system is not just a veil on real transactions but also affects their outcomes. However, whatever the merit of such arguments may have been earlier, it seems rather difficult to argue that transactions costs, at least in the normal rather narrow meaning of the word, could be a significant factor given the rapid progress of information technology.

Much more important is likely to be the degree of knowledge economic agents have about many relevant aspects with regard to financial contracts, which by definition deal with uncertain future contingencies. The notion of a smoothly functioning financial system is in effect based on the idea that despite uncertainty about future circumstances, agents can agree and complete transactions concerning all possible contingencies. Under the assumptions of symmetric information and complete markets, financial transactions can be conducted just as any other transactions.

A basic result under the assumption of complete financial markets is that the value of a firm is independent of its capital structure in the absence of bankruptcy costs<sup>4</sup> or external frictions such as taxes (Modigliani and Miller 1958). Thus the amount of debt does not in any way affect the real decisions of a firm. Private debt is inconsequential and can therefore be ignored in aggregate analysis. Similarly financial intermediaries are irrelevant with complete markets. Fama (1980) shows that under such an assumption it is of no consequence whether the investors own directly the financial instruments issued by the firms or whether they hold deposits of banks that in turn have the liabilities of the firms as their assets.

However, if economic agents are not equally informed about all relevant aspects of a potential transaction, i.e. if information is asymmetric, the results obtained under the assumptions of symmetric information and complete markets do not hold. In a pathbreaking paper Akerlof (1970) shows how a market can collapse if the seller has better information than the buyer of the quality of a good. The asymmetry of infor-

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<sup>4</sup> In a narrow sense bankruptcy costs comprise the deadweight costs caused by bankruptcy i.e. the administrative and legal costs of transferring ownership of a firm from the shareholders to the creditors. Economically also the loss of value due to attempts to avoid bankruptcy may be counted as bankruptcy costs: talented employees may leave, suppliers must be paid more timely, conflicts of interest between management and owners may distract management effort etc. This type of wider bankruptcy cost concept may perhaps better be called "costs of financial distress", see eg. Berger et al. (1995).

mation implies that lowering the price may not induce more demand as the potential buyers have a valid reason to expect that only low quality products, "lemons", will be sold at low prices. This type of adverse selection may quite well be a rather general phenomenon, not limited to Akerlof's example, used cars. In particular, entrepreneurs are likely to know much better the quality of their investment projects than outsiders from whom finance may be needed to realize the project.

Another problem caused by asymmetric information is moral hazard. The behaviour of the user of funds may be unobservable to the provider of the funds. As a result an entrepreneur may invest the funds in a riskier project than indicated to the lender.<sup>5</sup> With limited liability such behaviour is advantageous to the borrower as long as the lender does not take into account this incentive of risk taking in the pricing of funds. But a rational lender of course takes precautions against such behaviour, either by setting a default premium on funds or by rationing quantitatively the amount of funds to be lent.

Based on these ideas of adverse selection and moral hazard, a voluminous literature has emerged to explain why external finance is more expensive than internal finance and why in certain circumstances the "lemons premia" can become effectively infinite so that some potential borrowers are altogether denied credit (credit rationing). Furthermore, rationing need not be limited to debt finance but may also concern equity financing (equity rationing).<sup>6</sup> It is however important to notice

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<sup>5</sup> A riskier project here means that the return distribution has larger variance while the expected value is unchanged, ie. there is a mean-preserving spread of the distribution.

<sup>6</sup> Particularly the literature on credit rationing is vast and in fact rather sensitive to the precise assumptions about informational asymmetries. Jaffee and Russell (1976) were the first to show how adverse selection can lead to credit rationing in the sense that the size of a loan is restricted. The model assumes that borrower default probabilities increase with the size of the loan and that they vary at any given size across borrowers. The informational asymmetry is that the lender cannot distinguish the qualities of the borrowers *ex ante*. Therefore there is a lemons premium in the lending rate. Good borrowers may then prefer small loan sizes in order to lower this premium and the bad quality borrowers have to accept small loans in order not to reveal their type. Stiglitz and Weiss (1981) show how another type of rationing can emerge due to adverse selection: some of identical borrowers are denied loans. In this case the size of the borrower's project is fixed but the variances of the return distributions, which are private information of the borrowers, vary. Given limited liability of the borrowers and an assumed standard debt contract (the borrower pays a fixed contract rate or in default all of the revenue of the project), the expected return of the lender is the smaller, the wider is the return distribution of the project, at a given lending rate. This can lead to a situation where higher loan rates imply weaker average borrower quality. Therefore the supply curve of loans may bend backwards, and in the equilibrium some of the borrowers are, arbitrarily, denied loans. Mankiw (1986) highlights the possibility of a total collapse of a credit market due to adverse selection. In his model, a rise in the safe rate of interest or an increased lender perception of borrower risk may lead to a situation where no loans at all are supplied. However, the possibilities for and the nature of credit rationing may be significantly affected by the borrower characteristics and the types of contracts that are contemplated. Eg. a sufficient collateral provided by the borrower may eliminate credit rationing. The obvious problem nevertheless remains that the potential borrower may not have enough collateralizable assets. Also allowing dynamic aspects and a banking system consisting of several banks may change the results, see the survey of Bhattacharya and Thakor (1993). That adverse selection can lead to lemons premia or quantitative constraints on external finance is not limited to debt finance. Myers and Majluf (1984) and Greenwald, Stiglitz and Weiss (1984) show that asymmetric information about a firm's net worth may constrain the issuance of new equity capital. The problem is that the outside investors do not know whether the funds would be profitably used or whether they would be used to make the new investors to share in the bad assets of the firm. Therefore the issuance price may contain a lemons discount or at an extreme no shares can be issued at all.

that rationing ie. quantitative restrictions on external finance is not the only manifestation of information-based friction in financial intermediation. In less extreme cases the effect takes the form of price premium.

Moral hazard can also lead the "insiders" of a firm (managers, principal shareholders) to divert a part of the firm's resources to own consumption or make them limit management effort and thereby harm the interests of the outside shareholders. This problem related to equity finance can be alleviated if the outsiders hold debt instruments instead of equity. In that case the marginal benefit from effort and not shirking falls fully to the insiders, and the misalignment of insider incentives vanishes. On the other hand, such a leverage implies that increasing the riskiness of the firm's operation benefits the insiders who obtain all profits exceeding the debt service while they loose little in the case of bad realizations. Thus both debt and equity finance may involve risks to the outside providers of funds. They need to be compensated by preemia on such funding. Jensen and Meckling (1976) argue that these types of agency costs lead to an optimal debt-equity structure even in the absence of taxes, in contrast to the Modigliani-Miller irrelevance result.

In addition to the adverse selection and moral hazard problems, imperfect information may imply an ex post verification problem. The provider of funds may not be able to determine the outcome of the project financed without incurring costs. And the user of the funds obviously has the incentive to always report a bad outcome. The provider of the funds has to be compensated for the verification costs. Townsend (1979) shows that under "costly state verification", the standard debt contract is an optimal arrangement in sense of minimizing the expected verification costs. This gives further strength to the analyses concerning eg. credit rationing that are based on the assumption of a debt contract.<sup>7</sup>

## 2.2 Implication: balance sheets and cash flow matter

The theories discussed above suggest that on the basis of the informational asymmetries that result in adverse selection, moral hazard, and verification problems, the observed or shadow cost of external funds exceeds that of internal funds. Furthermore, the smaller is the net worth of a firm, the more difficult it is to align the interests of the external providers of funds and the firm insiders, and the higher is the premium on external finance.

Therefore, the higher is the readily available internal finance in the hands of a firm, cash flow, the less there is need to resort to external finance and the lower the marginal financial costs. Similarly, the more there are collateralizable assets in the firm, the smaller is the premium on external funds. As a consequence, the effects of many macroeconomic variables are transmitted through the balance sheet rather differently from what would obtain in the absence of informational asymmetries. A neat illustration of this is provided by Gilchrist, Bermanke and Gertler (1994). In their example the difficulties associated with external funding are so severe that only fully collateralized borrowing is possible.

Assume that an entrepreneur commits in period 0 a physical capital stock  $K$  (durable asset that has alternative uses and can be used as a collateral), and a variable

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<sup>7</sup> See eg. Gale and Hellwig (1985) and Williamson (1986).

input  $x_1$  (labour, capital that has no value outside the firm or the period) to produce output  $f(x_1)$  in period 1.  $f(\cdot)$  is assumed increasing and concave.

In the beginning of period 0 the entrepreneur has a cash flow from previous production  $f(x_0)$ , and an inherited debt obligation  $r_0 b_0$ , where  $b_0$  is the past borrowing and  $r_0$  is the real rate of interest on this debt. Therefore, the purchases of the variable input  $x_1$  and new borrowing  $b_1$  are related as follows:

$$x_1 = f(x_0) + b_1 - r_0 b_0 \quad (1)$$

The entrepreneur chooses  $x_1$  and  $b_1$  in period 0 to maximize output in period 1 net of debt service. Given the requirement that only fully collateralized borrowing is possible, the external funding is constrained by the market value of the collateralizable assets:

$$b_1 \leq (q_1/r_1)K, \quad (2)$$

where  $q_1$  is the market value of the fixed capital at the end of period 1 and  $r_1$  is the real interest rate on borrowing  $b_1$ .

Combining (1) and (2) implies that the spending on variable input  $x_1$  is constrained by the entrepreneur's net worth, which is the sum of cross cash flow  $f(x_0)$  and net discounted assets  $(q_1/r_1)K - r_0 b_0$ :

$$x_1 \leq f(x_0) + (q_1/r_1)K - r_0 b_0. \quad (3)$$

The unconstrained amount of spending on the variable input  $x_1$  is defined by the marginal condition  $f'(x_1) = r_1$ . But this can be achieved only if it is not greater than the borrower net worth (RHS of eq. 3). When the net worth constraint binds, the shadow value of a marginal unit of internal funds is  $f'(x_1)$ , which on the basis of the assumptions on  $f(\cdot)$  exceeds the going rate of interest  $r_1$  in the external capital market.  $r_1$  should be thought of as a riskless rate, given the requirement that all lending is fully collateralized. Furthermore, with a binding net worth constraint, any decline in net worth increases the premium on external funds and reduces the entrepreneurs spending.

In the absence of the net worth constraint, only the interest rate  $r_1$  affects the spending decision. It is thus this standard cost-of-capital effect, through which all shocks moving the real interest rates work.

However, when the constraint is binding, the effect of the real interest rates is different, and asset prices become important as well. An increase in the expected real rate of interest  $r_1$  reduces spending through its impact on the discounted value of collateral. In addition, unlike with no net worth constraints, an increase in the real rate applied to the existing debt  $r_0$  now reduces spending through its impact on the burden of debt service. Finally, a decline of asset prices ( $q_1$ ) lowers the value of collateral and thus spending.

Monetary policy transmission depends very much whether or not the net worth constraint binds. If it does not, the standard transmission mechanism is valid: money shocks affect the expected real rate of interest  $r_1$ , and through the cost-of-capital mechanism spending. However, if the net worth constraint is binding, the transmission mechanism is very different. Now changes in the rate applied to the existing stock of credit influences net worth and thus spending. On the other hand,

the interest rate applied to new financial contracts affects spending only through the discount factor and asset prices.

## 2.3 Implication: financial intermediaries matter

The idea that information problems may cause frictions in financial intermediation can also be used to rationalize the existence of intermediary institutions. There are several ways in which intermediaries may alleviate the difficulties caused by information problems.

First, the intermediaries can evaluate potential borrowers to determine whether they are good risks or bad risks. If the borrowers' projects are large relative to any potential lender's resources, the evaluation costs can be economized by delegating the evaluation to an institution. Boyd and Prescott (1986) provide an analysis of how financial intermediaries, "intermediary coalitions", can be an efficient solution for such an evaluation problem. An essential feature of this coalition is that it is large so that it through risk pooling can lower the risks of its liabilities, and therefore need not be evaluated by the ultimate lenders.

Second, when the information problem is that of verifying the outcome of the project for which finance is sought, an intermediary can be delegated the task of monitoring the project outcome. Diamond (1984) and Williamson (1986) show how in this context a large financial intermediary emerges as an efficient monitoring agent, whose claims on the investors are standard debt contracts and who issue riskless debt to the ultimate lenders. Again diversification of the idiosyncratic risks of the borrowers is the reason for why the liabilities of the intermediaries become riskless and require no monitoring on the part of the ultimate lenders. However, also bank capital can provide a cushion that insulates the depositors from a variation in the aggregate returns on bank assets. This mechanism is particularly relevant, if there is a systematic component in the return variation of bank assets. In this case, a finite intermediary size is implied.<sup>8</sup>

Third, somewhat differently, intermediaries can be motivated as a way to allow high yielding long-term investments despite the lenders' need to have liquid assets. The informational problem in this case is that a lender's liquidity need is private information. Diamond and Dybvig (1983) show how a bank issuing demand deposit can provide insurance for risk-averse lenders against such liquidity needs while allowing long-term investment. The model implies an inherent instability of this type of banking. Expectation by depositors that other depositors would withdraw their deposits and force a default of the bank precipitates an early withdrawal. Thus an expectation of a bank run can become self-fulfilling.<sup>9</sup>

The provision of highly liquid liabilities, demand deposits, is the special feature of the intermediaries that are called banks. Combining supply of liquid liabilities and information intensive risky lending may be motivated by the advantages of using information on the loan customer's transactions account in the monitoring of her

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<sup>8</sup> See Winton (1995).

<sup>9</sup> A liquidity based rationale for banks has been constructed also without risk-aversion, see Williamson (1988).



performance (Fama 1985). On the other hand, demand deposits can work as a means of disciplining bankers in the case of indications of bad performance, and allowing such an instrument lowers the cost of capital for the banker.<sup>10</sup> Both arguments suggest that the banks supplying liquid liabilities are not by accident in the business of risky lending.

The existence of intermediaries may also be rationalized by the idea that intermediaries may help in creating efficient long-term relationships, which would not be possible otherwise given the difficulties of writing complete and binding contracts.<sup>11</sup> Good information about the borrower may allow an intermediary to commit herself to financing the borrower even in bad times. On the other hand, the commitment on the part of the borrower to keep the relationship also in good times when cheaper financing might be available elsewhere allows such relationships to be profitable for the banks. Obviously competition by outsiders may make such arrangements unsustainable.<sup>12</sup>

Finally, in a related way, intermediaries may have a special role in exercising control over borrower assets in the case of default. In the absence of complete contracts, debt contract may be an optimal way of allocating control rights, see Aghion and Bolton (1992). Banks or other intermediaries in turn may be better in exercising such control than – a typically large number of – bondholders, as the latter's involvement may be hampered by free rider problems.<sup>13</sup>

The basic point of the above theories of financial intermediation is that financial intermediaries provide valuable service in facilitating financing for high-yielding projects that otherwise would not materialize to the same extent. Intermediary and particularly bank credit is special in that it cannot easily or perfectly be substituted for by other types of finance. Therefore any change in the supply of intermediary credit is likely to change the overall supply of credit.

Furthermore, the theories predict that certain types of firms and projects are particularly dependent on financing from banks and other intermediaries. First, firms with high net worth relative to the projects need less uncollateralized finance and therefore need less evaluation and monitoring. Second, firms that have reputation for honoring their financial commitments may not need to be monitored or evaluated, and may therefore efficiently use direct finance from ultimate lenders (Diamond 1991). Thus particularly new and small firms are likely to be "information intensive" and depend on intermediated finance.<sup>14</sup>

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<sup>10</sup> See Calomiris and Kahn (1991).

<sup>11</sup> See Mayer (1988) and Hellwig (1991).

<sup>12</sup> See Petersen and Rajan (1994a).

<sup>13</sup> See eg. Davis and Mayer (1991).

<sup>14</sup> The tendency that small firms are more dependent on intermediated finance than large firms may be reinforced by the workings of securities markets, which are likely to apply higher bid-ask spreads to the securities of less well-known issuers, see Bhattacharia and Thakor (1993).

## 2.4 Supply of funds to risky undertakings can be both “insufficient” and “excessive”

Adverse selection and moral hazard typically create frictions in financial intermediation so that external finance to risky undertakings takes place in a lesser degree than would be the case in the absence of incentive problems. However, this need not always be the case. Depending on the precise incentive problem also excessive risk taking by the intermediaries can take place.

One source of such excessive risk taking are misguided government policies. In the aftermath of the large-scale bank failures during the Great Depression in the United States and a number of other countries, financial markets and banking in particular were seen inherently unstable in the absence of government regulation.<sup>15</sup> The result was that financial institutions in most industrialized countries were subjected to tight regulations of different kinds. An important such regulation is compulsory deposit insurance.

Starting with the analyses of Merton (1977) and Kareken and Wallace (1978), the side effects of deposit insurance schemes have received considerable attention during the last 20 years. The basic argument is very simple. Deposit insurance removes bank risk from the depositors eliminating all incentives of the depositors to monitor bank behaviour and to limit the banks' risk taking through risk-based pricing or rationing. Therefore, provided the premium paid by the bank for deposit insurance does not adequately reflect bank risk, bank value can be increased through increasing the riskiness of bank portfolio. The standard moral hazard problem emerges. The amount of equity capital is an important determinant of this moral hazard behaviour. If there is only little equity to begin with, the moral hazard incentives are strong, as there is little for the owners to lose in the case of bad return realizations. Thus particularly the banks which due to earlier losses have lost most if not all of their equity are likely to engage in a “gamble for resurrection”.<sup>16</sup>

However, an explicit deposit insurance scheme is only one way of eliminating the incentives of bank creditors to limit banks' risk taking. Qualitatively the same results emerges if the creditors can trust that the authorities would not let a bank to fail anyway, because of anticipated negative macroeconomic consequences. Particularly large banks, which have a central role in the payments systems have been argued to benefit from this type of “too big to fail” policies, see eg. Kaufman (1992).

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<sup>15</sup> The thought that a smooth functioning of financial markets needs intervention on the part of authorities dates back much earlier. According to Humphrey (1992), Thornton (1802) and Bagehot (1873) are early contributions to the discussion about the appropriateness of a lender of last resort policy of a central bank.

<sup>16</sup> In the tightly regulated environment prevailing in most countries until the 1980s, the detrimental incentive effects of undepreciated deposit insurance were limited by two forces. First, regulation could directly limit banks' portfolio choice and thus risk taking. Second, effective entry restrictions tended to create “charter value” to the regulated activity holding up bank net worth, which discourages excessive risk taking.

Some recent analyses have suggested that also conflicts of interest between bank management and bank owners can result in excessive risk-taking by the banks.<sup>17</sup> They are based on the idea that management ability varies and is private information about which outsiders can infer only from the return of the portfolio chosen by the management. And a management of low ability makes risky short-run decisions in order to conceal her bad quality from outsiders.

Gorton and Rosen (1995) consider a three period model with risk neutral bank managers and bank owners. The manager can keep his position in the second period and thus continue to earn salary only if the return on the portfolio she has chosen is good enough for the owners. Managers who do not have an ability to find good projects to finance tend to choose too risky portfolios (relative to the situation of no asymmetry of information about manager ability). If most managers are of bad quality, their choices determine aggregate risk taking in banking. Identifying the case where most bankers are of poor quality with overcapacity when banks typically cannot be very profitable leads to the conclusion that overcapacity may induce bank managements without sufficient stake in the bank to take excessive risks. Rajan (1994) simply assumes that the bank manager values short-term profit at the expense of value maximization, and particularly so when other firms are doing well.<sup>18</sup> The main implication of the Rajan model is that in "good times", ie. when the industry is on average doing well, banks whose lending has turned out to be "bad" have an incentive to postpone revealing the result to a period when all banks' results are bad. A bank can do this through further lending to the troubled customers. There is thus an expansionary bias in lending in good times.

But there are many other, more general arguments according to which the financial intermediation may contribute to excessive risky investments. A popular claim is that fierce competition in the financial markets leads to excessive lending. This intuition has resulted in different types of more rigorous arguments. One of them is directly associated with the aforementioned moral hazard incentives of underpriced deposit insurance or implicit creditor protection. Stiffer competition – say due to lifting of regulations or technological development – is likely to reduce the margins of intermediation, ie. banks' net worth. As noted above weaker bank net worth strengthens the latent moral hazard incentives of equity holders (and perhaps the management) for risk taking.<sup>19</sup>

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<sup>17</sup> This differs from the traditional view about the potential differences in the interest of managers and owners, according to which manager behaviour is thought of as being too conservative relative to the value maximization. The reason is that managers are induced to behave in a risk-averse manner, as they cannot diversify their human capital which tends to be firm-specific.

<sup>18</sup> A reason could be that supporting the stock price (relative to other firms) through high profits helps the bank to raise new capital. An alternative is that the manager believes that his future reward (through reputation in the labour market) depends on his relative current performance vis-à-vis other managers, and that good performance is valued more when also other managers are performing well than when they perform badly. The motivation behind the latter assumption is that if all managers behave badly, the results are likely to be interpreted to stem from an industry-wide shock rather than from the actions or ability of the manager.

<sup>19</sup> See Boot and Greenbaum (1993) for a theoretical analysis in which increased competition eliminates monopolistic rents which hinder underpriced deposit insurance from inducing strong moral hazard behaviour.

But competition may affect loan supply behaviour in other ways as well. One idea is that competition may lead the banks to pay too little attention to borrower quality. For example Riordan (1993) argues that the banks' efforts to screen borrowers may be reduced by increased competition as the benefits from such activity decline with more competition.<sup>20</sup> But it is not at all clear that less information gathering necessarily means more risky lending. As Broecker (1990) shows, the lesser profitability of screening due to increased competition may in fact make lenders more conservative in their lending policies in fear of what is called the "winner's curse". Increase in the degree of banking competition may lead to higher interest rates and less lending also due to interactions with the imperfectly competitive product markets, even though loan quality may decline, see Koskela and Stenbacka (1995).

Some further ideas about the role of bank competition pay no explicit attention to credit risk but rely on changes in strategic behaviour. In particular, it has been argued that liberalization of financial regulation induces additional competition, as the banks attempt to capture market shares early on in the expanding market, see e.g. Vives (1991). It has been also argued that independently of any regulatory changes, monopolistic competition can lead to price wars in times of high demand, as the benefits from aggressive pricing relate to a larger-than-average overall demand while the retaliation of the competitors will have an effect at a later stage of more normal demand (Rotemberg and Saloner 1986).

### 3 Financial factors and aggregate fluctuations

The claim that the availability and cost of credit or finance in general relative to the safe rate of interest vary and no perfect substitute exists for bank credit suggest that aggregate economic behaviour may be affected by "financial factors".

Perhaps the simplest way to analyze the aggregate effects of financial factors is to introduce bank credit as an imperfect substitute for bonds into an otherwise standard ISLM model (Bernanke and Blinder 1988). An obvious message is that a change in monetary policy (supply of bank reserves) not only affects the safe rate of interest but also increases supply of bank loans and thereby aggregate demand. A positive shock to the loan supply function, eg. due to decreased perceived riskiness of lending, leads to a lower loan rate and higher output and (with higher transaction demand for money) to a higher safe rate of interest. The difference between the risky lending rate and the safe bond rate thus declines. A negative shock works in the opposite direction, say, a decline in bank capital leading to reduced supply of loans, smaller output and higher spread between the lending rate and the safe rate.<sup>21</sup>

However, embedding imperfectly substitutable bank credit into a macro model is not very satisfactory, as one does not really know how the assumed financial market friction interacts with macrovariables. Several theoretical models have been

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<sup>20</sup> See also Kannianen and Stenbacka (1996).

<sup>21</sup> A more comprehensive financial system than that just consisting of money had been analyzed already earlier particularly by Tobin, see eg. Brainard and Tobin (1963) and Tobin (1969). However, these models were not based on any well-established theory about the role of financial intermediation.

constructed to bridge the gap. One such analysis of the aggregate effects of borrower net worth is provided by Bernanke and Gertler (1989).

The analysis demonstrates the effects of costly state verification in an overlapping generations model with two types of agents, entrepreneurs and lenders. In the absence of informational asymmetry ie. verification costs, cost of capital and investment are constant in the face of productivity shocks. Production varies with the serially uncorrelated shocks, while consumption is smoothed over time and thus displays serial correlation. Introducing positive verification cost makes cost of capital positively related to borrower net worth. Current investment and through the increased capital stock future investment respond then to productivity shocks. Serially uncorrelated shocks are propagated through a "financial accelerator" into cyclical fluctuation not present without the friction in the capital market. Furthermore, a redistribution of wealth from borrowers to lenders in one period leads to lower investment for several periods. Thus for instance an unexpected decline in inflation can disturb the real debt burdens and lead to a persistent decline in output.

Many other models with different information problems produce analogous results of net worth propagating the effects of shocks. Bernanke and Gertler (1990) analyze in a static framework the perhaps quantitatively more significant problem of lenders not knowing the borrowers' types, actions and project qualities. Greenwald and Stiglitz (1993) consider a set-up where firms cannot diversify risk and therefore act in a risk-averse manner. Equity issue is constrained by information problems. Random price shocks move equity and through that working capital and production, which will not return the pre-shock level before net worth has recovered. In Kiyotaki and Moore (1995) the price of an asset which is used both as input in production and as collateral for lending is the key factor through which shocks to productivity and net worth distribution propagate over time and sectors leading to persistent fluctuations in output and asset prices.

Lamont (1995) presents a stylized general equilibrium model in which "debt-overhang" ie. existing debt prevents firms from financing as such profitable investments (net present value positive) if expectations are "pessimistic" but sets no such constraints if expectations are "optimistic". The model can result in multiple equilibria because of strategic complementarities: if a firm expects other firms to increase investment, it finds optimal to invest more too. Existing debt, which has to be serviced first, may prevent firms from undertaking as such profitable investments. Due to the interdependence of investments of different firms these debt problems spill over into the behaviour of other firms. Lamont points out that the debt overhang is likely to result in low-activity equilibrium particularly in the aftermath of a period of optimistic expectations during which leverage becomes high, as low-activity equilibria are considered unlikely. This implication resembles very much what Fisher (1933) wrote about the "havoc" caused by "overintebtedness" followed by deflation.

Intermediaries have been incorporated explicitly in several analyses. Williamson (1987) constructs a model, where (large) financial intermediaries emerge endogenously to economize monitoring costs. Credit is rationed and the amount of rationing varies over business cycle in response to changes in the default probabilities of the borrowers. Output displays cyclical variation and is negatively related to risk premia, much as in Bernanke and Gertler (1989). Variation in intermediary credit and liabilities lead output variation. The intermediaries' ability to attract deposits from ultimate investors is based on perfect diversification of the idiosyncratic risks of lending through large (in fact infinite) size. However, the sort of banks suggested by

the analysis do not resemble too much observed intermediaries, which typically use non-negligible amount of capital as a buffer between asset returns and the contractual commitments vis-à-vis their creditors.

An early analysis of the role of intermediary capital is provided by Bernanke and Gertler (1987). They focus solely on intermediated credit on the premise that owing to technological advantages in project evaluation and monitoring only bank credit is available to risky investments. The basic message is that both borrower net worth (value of collateralizable assets) and intermediary capital are essential for risky investments to find financing. A collapse of either would be sufficient to shift financing from risky projects to safe assets.

Intermediary capital plays an important role also in the analysis of Tirole and Holmström (1994). In their model both direct finance from the ultimate investors and intermediated finance can be used to realize investments for which the entrepreneur's own funds are not sufficient. External finance is limited by borrower capital, because only by investing own capital in the risky project the entrepreneur can credibly commit herself to not shirking i.e. choosing an inferior project that gives private benefit. Monitoring by an intermediary (only intermediaries assumed to have the capacity) may eliminate the most inferior projects. But the intermediary also has an incentive problem vis-à-vis the investors, and to overcome that it needs to invest some of its own capital in the project. Intermediation is thus constrained by intermediary capital.

The model predicts that high net worth firms rely on direct finance, which is cheaper than the intermediated finance due to monitoring costs, firms with less capital resort to intermediated finance and low capital firms may be forced to skip investment. Negative shocks to firm capital ("collateral squeeze"), bank capital ("credit crunch") and savings ("savings squeeze") all reduce investment, and the first to do so are low net worth firms. The effects on interest rates differ however. Credit crunch increases the rate firms pay for intermediated credit while it decreases the rate paid to the investors. Collateral squeeze decreases both.

Although the recent models on the role financial intermediation in aggregate economic fluctuations differ in many respects from one another, they share several common features. First, they suggest that many types of shocks not only spread but get magnified – propagate – through the financial system, where frictions of intermediation increase in response to shocks. There is a "financial accelerator". Importantly, a small one-time shock may lead to long-lasting variation in output and prices.

Second, given that financial intermediaries are seen as an efficient arrangement to alleviate the inherent intermediation frictions, any shocks to the intermediaries' capacity or incentives to channel funds affect the scale and efficiency of external finance as a whole. Direct finance from ultimate savers to the users of funds is not a perfect substitute for intermediary finance. In a sense, financial intermediation may be disturbed at two places: (1) borrowers' credit quality may be affected by their balance sheets, and (2) intermediaries' credit supply may be affected by various shocks. Monetary policy may affect real outcomes through both mechanisms, which combined constitute "a credit channel" as opposed to the money channel embodied in the ISLM framework.

Third, changes in the attractiveness of safe and risky financial instruments play a central role in all these theories. They predict in particular that when the frictions in intermediation are high, there is substitution from risky "information intensive"

assets into safe ones, "flight to quality", which is reflected in the relative prices ie. the yield spreads between risky and safe assets increase. Furthermore, in the financial intermediation story these spreads should be associated with observed spending decisions in contrast to conventional neoclassical models, see Gertler, Hubbard, and Kashyap (1991).

Fourth, the propagation mechanism is likely to be non-linear. As the frictions in financial intermediation are greatest with low borrower net worth and high uncertainty, the effects of any shocks are particularly strong in economic recessions, characterized by low cash flows, low asset values and high uncertainty. Therefore these mechanisms would seem to be more capable of rationalizing changes in activity in deep downturns and recessions than when activity and asset values are high and still growing.

Fifth, the theories based on information and incentive problems of financial intermediation suggest a specific type of definition for financial crises (Mishkin 1994): "A financial crisis is a disruption to financial markets in which adverse selection and moral hazard problems become much worse, so that financial markets are unable to efficiently channel funds to those who have the most productive investment opportunities". This is in contrast with many traditional views of financial crises, which either emphasize the role of banking panics reducing money supply (Friedman and Schwarz) or the role of unexplained changes in expectations (Kindleberger, Minsky).

Sixth, the theories are "real" rather than monetary explanations of economic cycles. Monetary shocks may or may not affect the economy, depending on the model. However, one if not the only way they affect real outcomes is through changes in the supply of risky credit or finance in general. A "credit channel" of monetary policy is suggested, provided monetary policy at all can affect real outcomes.

Finally, although most of the reviewed theories about the role of balance sheet structures and financial intermediation rationalize why intermediation and economic activity may be smaller than what would obtain in an undistorted Modigliani-Miller world, "excessive" risky undertakings are not excluded either.

## 4 Empirical evidence

Even though the case can be made on theoretical grounds that financial intermediation is plagued with distortions that matter for real outcomes, whether they indeed matter is an empirical question. Both the significance of the potential distortions and their variation over time depend on a host of factors whose importance is difficult to assess a priori. Therefore a vast empirical literature has emerged to explore the importance of financial intermediation in various historical episodes.

One set of studies have focused directly the on intermediation process trying establish whether the observed patterns of financial stocks or flows and financial prices are inconsistent with the standard Modigliani-Miller type of assumptions but consistent with some alternative hypothesis. Another approach is to examine whether the behaviour of real quantities such as production, sales, purchases of goods or employment displays patterns which would be inconsistent with the standard assumptions but consistent with some hypothesis about the role of financial factors.

Both types of analyses have been conducted with both aggregate and disaggregate micro data, although the latter have been more typical reflecting the nature of the potential financial distortions.

In this section the main empirical findings are briefly summarized. Evidence concerning Finland is not touched upon at this point, it will be discussed in the next section.

## 4.1 Functioning of the financial system as such

### Direct tests of credit rationing

One set of questions concerns the nature of equilibrium in the financial markets. As noted above, some theories based on asymmetric information suggest that price mechanism may not equilibrate demand and supply for credit, but there is quantitative rationing in the sense that at least for some borrowers increasing the price of credit does not result in increased supply of funds. However, attempts to test directly credit rationing have given rather mixed results. A key prediction of the theories of credit rationing is that the prices charged for loans do not vary as much the safe rates of interest of similar maturity. Although some studies have found that bank loan rates have indeed been "sticky", the evidence cannot necessarily be interpreted as supporting credit rationing. The observed stickiness may relate more to long-term credit relationships than rationing, as the stickiness has been found to concern also loans made under loan commitments ie. customers who should be protected from rationing.<sup>22</sup> Nevertheless, given the multidimensional nature of loan contracts, identifying the price for credit as the rate of interest may be misleading, calling into question the usefulness of direct tests of this sort.

### Imperfect substitutability of bank lending

Another line of research is to examine the uniqueness of bank or in general intermediary lending ie. whether there is evidence that access to bank loans is valuable so that it cannot be costlessly substituted for with external finance from other sources. On balance, the evidence seems to support the idea of imperfect substitutability. For example, Fama(1985) documents that the interest rates paid by American banks for money market funding (CD's) have been very close to commercial paper rates, despite the fact that only CD's have been subject to a costly reserve requirement. Fama concludes that bank borrowers must bear the cost of reserve requirement, and their willingness to do so suggests that bank loans are valued over other finance.

Similarly, James (1987) finds that in a sample of 300 American firms announcements of new bank credits resulted in significant positive abnormal returns on firm equity while corresponding announcements of bond issues were followed either by no significant return response (public debt) or by a significant negative

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<sup>22</sup> See Berger and Udell (1992).



response (private placement). Some later studies have found similar evidence with different data sets.<sup>23</sup>

A rather different approach to the imperfect substitutability issue is to examine the mix of borrowing by the non-financial sector. Thus Kashyap, Stein and Wilcox (1993) find that the aggregate level ratio of bank loans to commercial paper declined after tightening of monetary policy in the United States in the period of the mid-1960s through 1989. They interpret this to suggest that bank loans and commercial papers are imperfect substitutes and that monetary policy works through a bank credit channel.<sup>24</sup>

### Tiering as an indicator of financial distress

A key prediction of the model of financial intermediation based on asymmetric information is that in "bad times" the yield premium of high risk assets over that of safe assets increases relative to "good times", ie. "tiering" takes place. The widening spread is thus a signal of increased frictions of financial intermediation, and should constrain spending. One should observe tiering particularly at times when other indicators suggest that intermediation is seriously disturbed, for example around banking panics. There is some evidence both of the influence of tiering on investment spending and of its signaling of banking panics.

Gertler, Hubbard and Kashyap (1991) find that inclusion of the spread between 6 months commercial paper rate and corresponding treasury bill rate improves significantly the fit of an Euler-equation for US investment spending in 1964–1989. However, it might be misleading to interpret the spread between the short-term rates as signaling in default premium, as commercial papers are typically issued by only very low-risk firms. As suggested by Bernanke (1990), such a spread may reflect more the stance of monetary policy.

On the other hand, Mishkin (1991) documents that an increase in the spread of high yielding corporate bonds over that of safer instruments (government bonds or the lowest yielding corporate bonds, depending on time period) preceded the banking panics in the United States prior to Second World War in 7 of the 8 cases. Based on this observation about timing, Mishkin concludes that the panics did not cause the changes in spread but were a reflection of the same fundamental increases of uncertainty that caused the spreads to increase. Also in two post-war occasions, in

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<sup>23</sup> See Slovin, Johnson and Glascock (1992) who document with a different data set that the positive return responses to loan announcements concern small firms but not large firms. A case study of the effects of the de facto failure in 1984 of a large bank, Continental Illinois and its subsequent rescue by the authorities shows that listed firms having a loan relationship with the bank displayed -4.2 per cent excess return on average in the failure stage, and 2.0 excess return on average in response to the announcement of the rescue plan (Slovin, Sushka and Polonchek, 1993). This can be interpreted as reflecting the value of the credit relationship for even large firms.

<sup>24</sup> Also in the period 1989–1992 the CP share increased substantially as commercial paper stock increased and bank lending contracted (Calomiris, Himmelberg and Wachtel 1994). Only highly rated firms issue commercial paper, and the change in the mix does not reflect firm level substitution but that firms dependent on bank loans are squeezed by the banks. Firms issuing commercial paper may alleviate this problem by extending trade credit financed by CD's. Gertler and Gilchrist (1993) report evidence, consistent with the above findings, that the share of small firms in bank business lending decreases after monetary tightening.

conjunction with the Penn Central bankruptcy in 1970 and the stock market crash of 1987, increases of spreads are visible. They remained small, however, presumably owing to the substantial interventions of the central bank to guarantee the liquidity of the important market participants.

Mishkin's conclusions about banking panics not being a primary cause but rather a reflection of financial distress is supported by the analysis of Gorton (1988). Gorton finds that the American banking panics prior to deposit insurance were triggered by large shocks (insolvencies of non-financial corporations) in the aftermath of business cycle peaks.

### Credit or capital crunch in the early 1990s

As was discussed above, bank capital limits banks' borrowing and as a consequence credit supply in many theories of adverse selection and moral hazard. In addition capital regulation may limit banks' possibilities to expand lending. The slowdown and even contraction of bank lending in many countries, particularly the United States in the early 1990 has provided fresh data for examining these hypotheses. This phenomenon, usually called credit crunch but also capital crunch has become the subject of a large number of studies, almost exclusively on American data.

The American literature, which has recently been surveyed by Passmore and Sharpe (1994) and Sharpe (1995), has given rather mixed results. Several studies examining the time paths of lending, interest rates, economic activity etc. conclude that bank lending indeed contracted in the early 1990s more than demand conditions and the stance of monetary policy would have warranted, see Akhtar (1994), Lown and Wenninger (1994). But most credit crunch studies have used data on individual intermediaries or some narrower aggregates of them (eg. different states of the U.S.). Many of these studies have discovered bank capital as an important constraining factor, ie. that the issue indeed is "capital crunch" (eg. Bernanke and Lown 1991). Some studies have furthermore implicated capital regulation or rather its tightening through higher requirements or through stiffer enforcement as the reason for capital insufficiency (eg. Peek and Rosengren 1995a). However, the results tend to depend a great deal on how extensively the analyses control for other factors: the more care is taken of eg. borrower quality, monetary policy conditions etc. the less important bank capital turns out to be in the regressions, see Berger and Udell (1994).

Studies with European data are few, and they do not go a long way to control for other factors than the hypothesized effects.<sup>25</sup>

### Excessive risk taking

The argument that underpriced deposit insurance leads to excessive risk-taking has been often cited in the context of bank failures. Particularly the behaviour of

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<sup>25</sup> The only studies directly examining the potential role of banks' changed supply behaviour with European data seem to be O'Brian and Browne (1992) partially on European countries, Llevellyn and Drake (1994) on the UK, and Soltila and Vihriälä (1992) and Saarenheimo (1995) on Finland. While all of them find some support for the existence of a credit crunch, the evidence is rather weak. The analyses of Soltila and Vihriälä and Saarenheimo will be discussed somewhat more in section 5.

American thrift institutions in the early 1980s is a frequently-used example of such moral hazard in action, see eg. White (1991). But systematic empirical studies of the hypothesis are few, and the results vary a great deal.

Perhaps the most relevant analysis is provided by Keeley (1990). He examined 150 largest American bank holding companies in the period of 1970 through 1986. He found evidence that low underlying profitability or rather a low "charter value" of a bank as measured by the ratio of the market value to the book value of bank assets had a positive impact on risk taking by the banks. Risk taking was measured by the ratio of the market value of equity to the market value of assets (the higher the ratio, the smaller the default risk) and by the CD rates (the higher the rates, the higher the default risk). Keeley argues that the driving force behind moral hazard was increased competition in the market for banking services, which lowered banks' charter value. Underpriced deposit insurance facilitated the risk taking but was not a problem as long as the owners' equity stake remained high due to the privileged position of banking.

But using a different methodology and examining some 1800 FDIC-insured commercial banks in the years 1983 through 1987 Shrieves and Dahl (1992) provide evidence of a positive relationship between bank capital and bank risk, which is in conflict with the moral hazard hypothesis. In their study risk is measured either by the share of non-performing assets or by the ratio of risk-weighted assets (as defined for the purposes of capital regulation) over total assets. An important aspect is that Shrieves and Dahl allow capital to be endogenous in the long run. Corroborating evidence is also provided by Randall (1993) and Furlong (1988).

In the aforementioned studies all the banks investigated are insured so that identifying the specific effect of deposit insurance very difficult. To overcome this problem Wheelock (1992) analyzes 257 insured and uninsured Kansas banks of the 1920s. He finds that the banks whose deposits were insured chose riskier portfolios and failed with a higher probability than the uninsured banks. Park (1994) examines data on basically all the FDIC insured banks for the years 1984 through 1988. He finds negative bivariate relationships between lending growth and other measures of risk taking on the one hand and capital asset ratios and earnings on assets on the other hand.

No studies seem to exist on the effects of deposit insurance or more generally implicit creditor protection on banks' risk taking using European data.

There have also been some attempts to examine the more general hypothesis advocated by Minsky and Kindleberger that banks' credit expansion tends to become "excessive" in times of "optimism" leading to excessive risk-taking and in the end to bank failures. Kindleberger himself provides evidence of such episodes by investigating 37 financial crises between 1720 and 1976. Several authors have, however, criticized Kindleberger's evidence strongly on the grounds that he does not define a financial crisis properly and does not in particular take into account the role of money supply.<sup>26</sup>

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<sup>26</sup> Schwarz (1986) argues that Kindleberger does not distinguish between "real" and "pseudo" financial crises, where a real financial crisis means a situation involving extreme demand for high-powered money. More generally the claims of Minsky and Kindleberger are criticized eg. by Benston and Kaufman (1995).

## 4.2 Financial factors and real variables

A large number of studies have examined directly the existence of a link between financial factors and real quantities (output, investment, employment, sales). Studies with aggregate data have produced rather mixed results. In contrast, analyses using micro data rather consistently suggest that real decisions indeed are affected by financial factors. Their overall importance remains unclear, however.

As the American Great Depression is one of the main impetuses for academic interest in the potential role of financial intermediation in aggregate economic behaviour, many studies have focused this period. In an influential contribution Bernanke (1983) argued that increased frictions in financial intermediation caused by both a reduction of borrowers' net worth and failures of intermediaries reduced production, even when monetary factors are controlled for. Bernanke's empirical analysis consists effectively of adding (lags of) the deposits of failed banks and liabilities of failed businesses or a spread between corporate bonds and government bonds in a Lucas-Barro type of monetary supply equation, where (lags of) unanticipated changes in money or price level are used to explain output variation. The estimated effects of the financial factors, while not diminishing the significance of the money or price variables, were clearly significant for the estimation period 1/1921–12/1941. Furthermore, when simulated over the worst depression period, the inclusion of the financial factors reduced the mean squared error by 50 per cent. However, Bernanke's findings do not seem to generalize to Canada, which did not experience any banking panics, suggesting that other disturbances of intermediation than those associated directly with the creation of bank money may have been quantitatively rather insignificant in North America in the 1930s.<sup>27</sup>

Many studies have investigated the relative merits of credit aggregates as opposed to monetary aggregates in forecasting various aggregate demand and production variables in the post-war period. The conclusions have varied a great deal depending on the exact formulation and data set.<sup>28</sup> This is true both for bank credit and for wider credit aggregates. Given the accounting connection between bank loans, which are a major component of overall borrowing by the private sector in most countries, and bank deposits, which constitute the main part of the typically used money concepts, the inconclusiveness of these aggregate time series analyses is not surprising.

Following Bernanke (1983), some recent studies have also tried to incorporate the condition of the banking sector into the analysis of aggregate time series. Samolyk (1994) examines whether personal income growth depends on lagged income and a number of variables reflecting the "health" of banks' balance sheets. The data are US state level aggregates for 1983 through 1990. She splits the observations on the one hand according to whether the share of non-performing loans is higher or lower than the national average in a given year and on the other hand whether the income growth is higher or lower than the national average. Samolyk finds that allowing parameters

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<sup>27</sup> Haubrich (1990) finds that in Canada the financial factors played no role, and interprets this to imply that without banking panics, which did not emerge in Canada, the role of financial intermediaries was not important. However, in a survey on the role of financial factors in Great Depression, Calomiris (1993) contests Haubrich's interpretation.

<sup>28</sup> See, King (1986), Bernanke (1986), Friedman and Kuttner (1993) and Ramey (1993).

to differ across the subsamples of different banking conditions improves significantly the fit of the model while such a difference across the two income growth categories is inconsequential. The results are thus consistent with the idea that banking conditions matter for real outcomes. However, some studies report quite the opposite results.<sup>29</sup>

The highly mixed results of the aggregate analyses have induced a great interest in using micro level – cross-section or panel – data to examine the dependence of real decisions on financial factors.

For example, Fazzari, Hubbard and Petersen (1988) investigate the dependence of investment on cash flow with data on listed American companies. They separate dividend paying companies and those who do not pay dividend. The latter ones are assumed on a priori grounds to be more likely to have higher costs of funding (or be rationed) than the former ones. Controlling for the nature of investment opportunities with a Tobin-Q variable, they find that cash-flow variables affect strongly investment of the a priori financially constrained firms but only little that of the dividend paying firms. Similar results have been found with data on other countries as well.<sup>30</sup>

A somewhat different approach is to examine Euler equations with and without a debt constraint. Whited (1992) does so with a sample of large American firms which he splits according to whether the firm has a bond rating or not. The firms with bond rating are assumed to be financially stronger i.e. face less borrowing constraints. The unconstrained equation is rejected both for pooled data and the group of no bond listing while it cannot be rejected for the group consisting of rated firms.<sup>31</sup>

Also inventory investment has been found to depend on financial conditions. Kashyap et. al (1994) document a firm level positive relationship between inventory investment and liquid assets with US data from the 1980s. The effect is pronounced in recession periods. However, such relationships are not necessarily universal. Vale (1995) estimates the same type of model for a cross-section of 881 Norwegian firms in 1992. In this case liquid assets are of no significance. Furthermore, inventory investment does not depend on whether the firm had a banking relationship with what Vale designates problem banks.

Most of the micro data studies on the effect of liquidity constraints on consumer demand support the hypothesis of imperfectly functioning financial intermediation. The studies typically find excess sensitivity of demand to current income for households that are a priori classified as potentially credit-constrained, see eg. Zeldes (1989). The role of household balance sheets has been emphasized particularly in the context of deep recessions. Mishkin (1978) argues that the liquidity constraints felt

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<sup>29</sup> Guenther et al. (1995) for example find no effect of banking conditions on real variables in a VAR analysis with data on the State of Texas for 1976Q1 through 1990Q4. The real stock of all bank loans, commercial loans, book value of equity capital, or the loan to asset ratio or equity to asset ratio have no influence on real industrial production, employment or real income, while there are relative strong reverse effects.

<sup>30</sup> Hoshi, Kashyap, and Scharfstein (1991) examine the dependence of investment on cash flow with data on Japanese firms. The so-called keiretsu firms, which are supposed to be less financially constrained, display less sensitivity of investment to cash flow than other firms.

<sup>31</sup> Studies with European data have yielded similar result, see Bond and Meghir (1994) on UK data and Estrada and Vallés (1995) on Spanish data.

by households due to weakening of their balance sheets were significant in reducing overall demand in the course of the American Great Depression through the effects on expenditure on durables and housing. King (1994) applies the same argument to the UK recession in the early 1990s.

### 4.3 Overall conclusion on evidence

On a whole there is substantial evidence that financial intermediation is plagued by frictions which raise the cost of external finance to many firms and households relative to what it would be in "perfect capital markets" and that the extra cost varies over time. Furthermore, banks appear to be a valuable source of external finance to many firms and households, so that variation in their loan supply affect the overall supply of external finance to the private sector.

In addition, the frictions seem to be significant enough to affect real decisions. Investment is affected not only by the profitability of investment projects and "the rate of interest", but also by the cost of external funds on top of that rate and/or quantitative constraints. A similar conclusion holds for consumption.

However, the exact mechanisms through which the financial factors affect behaviour are not clear. Thus the role of quantitative constraints as opposed to price premia is ambiguous. Similarly, although there is evidence about the importance of both the borrower balance sheets and intermediary behaviour, their relative merits are difficult to disentangle. More important, the quantitative significance of financial factors relative to other factors in explaining the observed patterns of aggregate economic fluctuations seems uncertain.

On balance, it seems plausible that financial factors have contributed significantly to deep recessions (particularly the Great Depression in the 1930s) and retarded recovery from some recession (eg. the 1990–1991 recession in the United States). But whether the "financial accelerator" is more generally an important element of aggregate economic fluctuations seems an open question. In particular, no solid evidence exists to support the hypothesis that "excessive" risky lending by banks and other financial intermediaries has contributed to economic booms. The leading testable hypothesis is that moral hazard created by underpriced deposit insurance or "too big to fail" policies of the regulatory authorities leads to excessive risk taking by banks. But evidence on this hypothesis is very mixed. Finally, a vast majority of the empirical analyses of the role of financial factors has been conducted with American data. As many institutional arrangement differ a great deal between different countries, these studies do not necessarily tell much about the situation in Europe.

## 5 The Finnish boom-bust cycle in the light of financial intermediation theories

### 5.1 Background: the financial system and deregulation

As in several other countries having experienced a strong debt-financed economic boom followed by a deep recession with stagnating or declining credit stocks after the mid-1980s, also in Finland the backdrop of the credit cycle was financial liberalization.

Until the early 1980s, the Finnish financial markets were in several important respects regulated. First, capital import and export were tightly controlled by the central bank. Most borrowing and lending across the border was subject to quantitative restrictions. Second, interest rates on bank loans and deposits were regulated at low levels, either directly by the central bank or indirectly by tying tax exemption on interest earnings to a given uniform deposit interest rate. As inflation often was high relative to the regulated lending rates and even households could deduct from taxable income interest expenses on loans up to a relatively high ceiling, regulation resulted in excess demand for credit probably for long periods of time. Regulation induced therefore credit rationing quite independently of any potential "equilibrium credit rationing".

Unlike in some other countries, banks were not required to invest in government paper. Instead, bank intermediation was heavily subsidized through tax exemption of deposit interest earnings. The securities market remained small and for the most part illiquid. In part this was the result of low government indebtedness: there was no need for large quantities of government paper which would have formed a solid foundation for the securities market. In part the insignificance of the securities market reflected the subsidization of bank intermediation.

The result was a highly bank-centered financial system, in which even large corporates relied on banks as the main source of not only short-term but also longer-term external finance. This tendency was further strengthened by the fact that banks were often times significant owners in major corporations, which was allowed by the banking legislation based on the idea of universal banks. The predominance of banks implied that any changes in banks' credit supply would very likely affect significantly also the overall supply of credit to the non-financial sector.<sup>32</sup>

Bank legislation in force in the mid-1980s distinguished between four types of banks: commercial banks, savings banks, cooperative banks, and the government-owned post-office bank (Postipankki or PSP)<sup>33</sup>. In practice, the types of business allowed for the different banking institutions did not differ a great deal. Thus, all banks could i.e. issue deposit liabilities, lend to non-financial corporations and

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<sup>32</sup> Also the insurance companies accumulating pension contributions have been significant lenders to the private sector. However, about half of their lending has been guaranteed by deposit banks. Thus, in terms of credit risk, the deposit banks have accounted for approximately 2/3 of the private sector's borrowing even in the recent years.

<sup>33</sup> As of the beginning of 1988, the legislation of the post-office bank has been essentially harmonized with that of commercial banks, so that it can for all practical purposes be considered a commercial bank.

households, provide payments facilities, trustee services, and guarantees as well as conduct securities transactions. In lending, the savings banks and the cooperative banks were restricted to lend only "against a safe security", but what would constitute such a security was not precisely defined. Another restriction on the business opportunities of these banks was that unlike the commercial banks, the local banks were not in general allowed to conduct in their own name transactions in foreign currency. In the 1980s the cooperative and savings banks neither had any direct borrowing facilities with the Bank of Finland nor were their certificates of deposit accepted as material for the central bank money market operations.

In terms of market behaviour it was typical to distinguish between five different banks or banking groups: two major commercial banks, KOP and SYP (Unitas), the Post-office bank, the savings bank group and the cooperative bank group. In the mid-1980s, the savings bank group consisted of some 250 savings banks and a commercial bank owned by the savings banks, Skopbank. Similarly, the cooperative bank group consisted of over 360 cooperative banks and a commercial bank owned by the cooperative banks, Okobank. Skopbank and Okobank conducted for the savings and cooperative banks, respectively, many transactions which were prohibited for these banks themselves, eg. borrowing from the Bank of Finland and from abroad. Thus the overall number of banks was very large, but in many respect there were only five major players in the market place. Although legislation did not imply any strict segmentation of the banking market, the commercial banks specialized in lending and provision of other banking services to the corporate sector, while the savings banks and cooperative banks provided banking services mainly to the households and small enterprises.

An implication of regulation also was that the banks were induced to compete with quality of services and in particular with the density of branch networks. The result was high costs of operation, and – by international comparison – relatively weak profitability.<sup>34</sup> This implied that some banks had considerable difficulties in meeting the capital adequacy requirements, even though they were not particularly demanding before the introduction of new regulations in the 1990s.<sup>35</sup> Although the regulatory capital requirements were more lenient for the savings banks and cooperative banks than for other banks, the capital adequacy problems were more serious for these types of banks. Given their legal nature as foundation-like entities (the savings banks) and cooperatives (the cooperative banks) they could not augment capital through issues of equity. Instead they would have to rely on retained earnings, which particularly for the savings banks typically were smaller than the as such meager average of the Finnish banks.

Deposits of all types of banks were covered by a 100 per cent deposit insurance, provided by the respective "security funds" of the commercial banks, the savings banks and the cooperative banks. Membership in a security fund was mandatory, and the insurance premium was flat rate, and in general very small so that the accumulated funds remained small.

In the early 1980s, the tight regulation of the financial markets started to become increasingly difficult, as financial innovation progressively created new opportunities

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<sup>34</sup> See eg. Vesala (1995a) for an international comparison.

<sup>35</sup> The capital requirement was 4 per cent of bank liabilities for the commercial banks and 2 per cent of bank liabilities for the savings banks and the cooperative banks.



for circumvention. Simultaneously, as in other countries, the doubts about the instability of an unregulated financial system gave way to the view that regulation was causing substantial losses in terms of both operational and allocative efficiency. A process of gradual deregulation started. In 1980, constraints on banks' short-term borrowing in foreign currency were substantially reduced. From 1982 onwards regulation of average lending rates was gradually eased by allowing the banks to pass through to lending rates a part of the extra costs of purchased funds over the regulated deposit rates. In August 1986 the remaining regulations on the average lending rates were lifted. Restrictions on capital import were also gradually eased through more liberal licencing practices and through exemptions of certain classes of borrowers from constraints altogether. As of August 1987 long-term foreign borrowing was fully freed for the corporate sector, with the exception of sales of markka denominated bonds abroad at issue. This last constraint was abolished in early 1990. Simultaneously, also restrictions on capital export were lifted. For firms, direct investments and portfolio investments abroad were freed in 1989, for households in 1990. The remnants of capital controls were abolished in October 1990 with the freeing of households foreign borrowing. In 1991, several larger savings and cooperative banks were authorized to conduct most operations in foreign currency including borrowing from from abroad in their own name.

Thus towards the end of 1987 capital import and price setting on bank lending had been liberalized in an important way, while tax rules continued to favour bank deposits and borrowing in general. Prudential regulation and supervision of banks and other financial intermediaries remained effectively unchanged, although preparations to tighten capital regulations began in the mid-1980s. By mid-1988 it had become clear that capital regulations would be tightened significantly along the lines suggested by the Bank for International Settlements. The new regulations came into force in fact in the beginning of 1991. Finally, as of the beginning of 1994, the capital regulations were fully harmonized with the EU regulation which correspond to the BIS recommendations. This last change implied a tightening of capital regulation for the cooperative and savings banks by several percentage points.<sup>36</sup>

Liberalization of lending rates and the simultaneous changes in the central bank's operating procedures contributed to an emergence of a true money market. On the one hand, banks could now pass through to the borrowers the cost of money market funds. On the other hand, as the central bank chose its own certificates of deposits (CD's) and those of the banks to be the instrument of market operations in early 1987, bank CD's became liquid instruments. The CD market provided a basis for a rapid development of markets for other instruments such as forward contracts. On the whole, the money market allowed the banks much more freedom in choosing the speed of credit extension, as they were not anymore as dependent on deposit financing as before. The change was particularly significant for the savings banks and cooperative banks, which had previously been able to finance lending in excess to deposits only by borrowing from their "central banks", Skopbank and Okobank. For some larger savings and cooperative banks, the conditions in the CD market became

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<sup>36</sup> The main difference in the 1991 capital regulations and the 1994 regulations is that according to the former regulations loans insured by an insurance company were classified in the 50 % risk category instead of the 100 % category. This had practical importance for the cooperative and the savings banks, as these banks had established mutual credit insurance companies to even out risks among the member institutions.

close to those of commercial banks in 1991, as several banks' CD's were then accepted as material for the Bank of Finland money market operations.

Lifting of direct regulations was accompanied by tax reforms seeking to reduce tax privileges of different kinds, lower the high marginal taxes on labour incomes and streamline the tax system in general. For the functioning of the financial markets, the most important measures concerned taxation of capital income and the treatment of interest expenses. The first step was taken in January 1989, as the scope for tax exemption of deposit interests was somewhat reduced, and capital gains taxation was tightened. These changes implied a slight increase in the average costs of bank deposits, and a flurry of enterprise sales towards the end of 1988 before the tightening of capital gains taxation would take effect. The introduction of a source tax for deposit (excluding the still-allowed tax exempt accounts) and bond income in the beginning of 1991 facilitated a true competition on deposit rates contributing to higher funding costs for the banks. Deductibility of interest expenses in personal taxation was reduced in several steps, but a major cut took place only in the beginning of 1993 together with a comprehensive reform of capital income taxation.

At the time of the major measures of financial liberalization, the overall economic conditions were rather favourable in Finland. The economy had been largely unaffected by the second oil shock in the end of the 1970s and had grown at a relatively rapid and stable rate over a period of several years. General government budget showed slight surplus, and the public sector had hardly any net debt. No major need for fiscal consolidation existed. Tax reforms rather worked in the opposite direction. Monetary policy was geared towards maintaining a fixed parity of the markka vis-à-vis a trade-weighted basket of currencies with a relatively small fluctuation band. The central bank also succeeded in defending the existing parities with exceptionally high interest rates for a short while in the Autumn of 1986. This presumably increased the credibility of the fixed exchange rate policy, leading many borrowers to discount the possibility of a significant depreciation of markka in the near future.

## 5.2 The salient features of the cycle

The financial liberalization was followed by an almost immediate surge of new borrowing by the private sector. Both firms and households increased their indebtedness substantially in 1987–1990. In the period of regulation, export industry had been favoured in the allocation of credit. The new opportunities opened up by financial liberalization concerned thus particularly industries (including services) producing for the domestic markets, and the households. Firms invested heavily in new capacity in retail trade, hotels and restaurants and recreational facilities, which all involved substantial construction activity. For households dwellings remained the main object of investment, although also purchases of durables and services increased strongly. Given the inelastic supply of land and dwellings, this led early on to a steep rise in housing and real estate prices, which boosted households' and firms' wealth considerably.

Expansion of credit was strongest in the savings bank sector. While bank credit about doubled between the end of 1986 and 1990, the rates of growth for the savings banks and Skopbank were 120 and 300 per cent, respectively. The difference was

particularly noteworthy in the second half of boom period in 1989 and 1990, when the growth of bank credit was already decelerating. Bank profitability improved relative to that of the early 1980s, as revenues increased rapidly while cost growth was much more subdued.

The boost to domestic demand was reinforced by buoyant demand in the western export markets in 1988 and 1989. Output responded very strongly; GDP growth exceeded 5 per cent in both 1988 and 1989, which brought the unemployment rate down to slightly over 3 per cent in early 1990. But also the external balance weakened, first mainly due to a weakening of the goods and services account but later increasingly due to the increased expenditure on the accumulating foreign debt.

In response to the very rapid growth of credit, weakening external balance and accelerating inflation, monetary policy was tightened in late 1988 and early 1989. Markka was effectively revalued by some 4 per cent in March, which led to higher short-term interest rates. Furthermore, deposit banks were levied an extra cash reserve requirement up to 4 per cent of deposits and some other funding items to penalize the banks, whose lending growth would not decelerate below a target path by the end of 1989. Most banks had to make these zero-yielding deposits at the central bank, but only in the case of the savings banks they were quantitatively significant. The extra reserves were paid back in 1990.

Stock prices and housing prices peaked in 1989 and credit growth started to decelerate. Also activity decelerated rapidly and on year-on-year basis there was no growth in 1990. On top of the weakening domestic demand and decelerating growth of western export markets, eastern export collapsed with the political turmoil in Soviet Union and other Eastern European countries. As a result GDP declined by over 7 percent in 1991. Simultaneously the exchange rate came under repeated speculative attacks and in November 1991 markka was devalued by 12.6 per cent, despite record high interest rates. Interest rates remained high, and production and asset prices continued to decline in 1992. GDP dropped by a further 3.8 per cent in 1992 and in September 1992 markka was let to float. The currency depreciated further so that in February 1993 a trade-weighted basket of foreign currencies cost 36 per cent more than prior to the 1991 devaluation. Output decline started to decelerate in 1993 but 1994 was the first year to display positive GDP growth on year-on-year basis. Unemployment increased in the process to an unprecedented level of almost 20 per cent of labour force. The resumption of output growth did not, however, lead to a renewed growth of credit. Credit stocks continued to decline through 1994 and 1995. Stock prices rebounded very strongly but prices for both residential and commercial property remained historically low still in 1994 and 1995.

Figure 1.

### Production, credit and interest rate

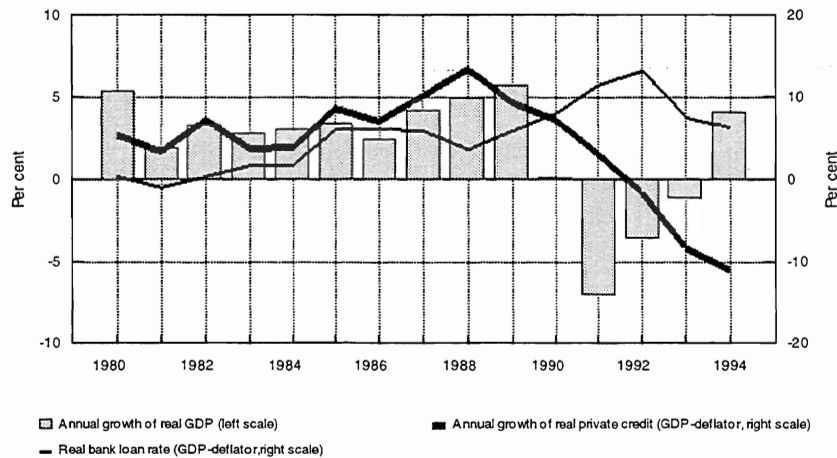
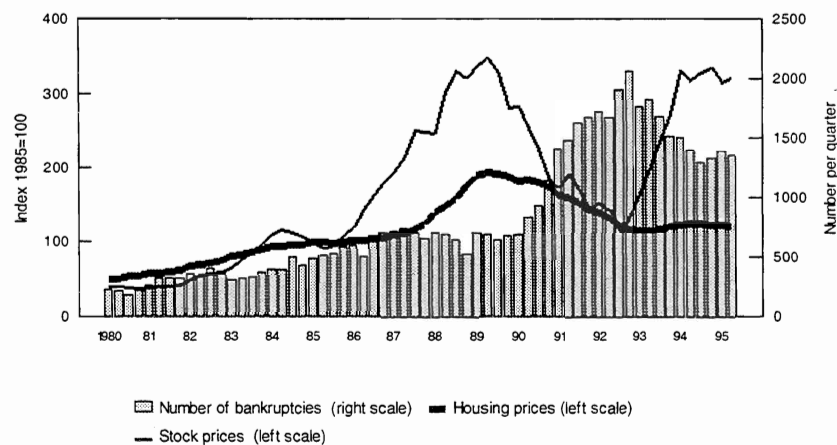


Figure 2.

### Stock prices, housing prices and bankruptcies



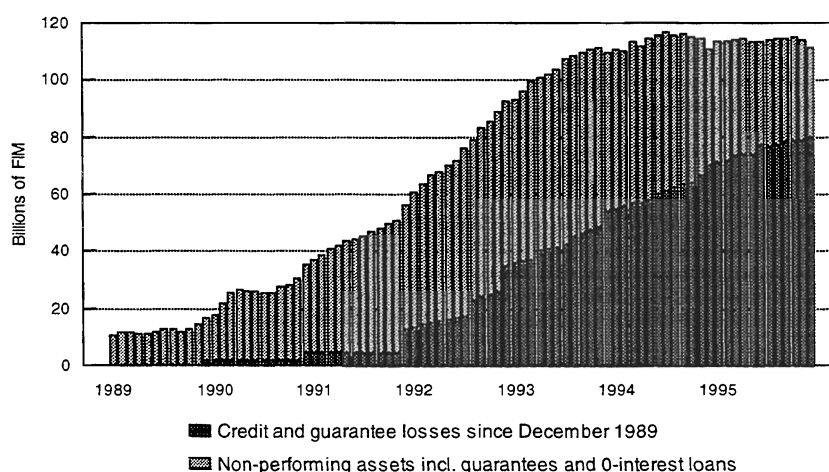
## 5.3 The banking crisis<sup>37</sup>

The dramatic decline in borrower incomes in 1991 and onwards reduced substantially their capacity to service debt. Higher short-term rates increased simultaneously nominal debt service burden for many borrowers. For the borrowers which had financed investment with loans denominated in foreign currencies, the burden was similarly increased by the depreciation of markka. Many such firms sold primarily or solely to the domestic market, so that the exchange rate change failed to have a compensating effect on revenues. Not surprisingly an increasing share of borrowers became unable to service debt. As banks account for some 2/3 of the credit risk of the private sector – either directly in the form of loans or through guarantees given to borrowers using other sources of finance – their loan stocks turned increasingly non-

<sup>37</sup> The evolution of the Finnish banking crisis and the measures taken by the authorities are described more in detail in Nyberg and Vihriälä (1994). Koskenkylä (1995) provides international comparisons of the extent of banking problems and the costs of bank support policies.

performing, many guarantee obligations were triggered and in due course of time unprecedented amounts of loans had to be written off.

Figure 3. **Banks' problem assets and credit losses**



The banking problems started to emerge already in 1989. Higher short-term interest rates, declining asset prices, weaker growth of credit and increased credit losses weakened bank profitability. Particularly the very expansionary Skopbank, which had accumulated significant securities holdings started to see profitability weakening through 1989. In 1990 the situation worsened, but most banks still made positive profits. Skopbank's difficulties increased, however. Although it managed to show a positive profit – thanks to capital gains associated with sales of property – the savings banks saw it necessary to increase Skopbank's equity by subscribing new shares by FIM 1.3 billion. The authorities put Skopbank on special surveillance.

In 1991 banks in general made loss, and in September an acute crisis of confidence in the money market brought Skopbank close to a closure. The Bank of Finland took over the bank, injected fresh capital of the order of FIM 2 billion and removed the assets with the greatest risks for write-offs to separate holding companies. The Skopbank rescue was followed by more general measures to support the functioning of the banking system in early 1992. The Government announced in March an action programme, which consisted of two major support measures. First, the Government offered all Finnish deposit banks a capital injection of FIM 8 billion, or some 14 per cent of the regulatory capital of the sector at the end of 1991. The offer to each bank was in relation to its risk-weighted assets and off-balance sheet commitments. Although the capital instrument – preferred capital certificate – shared many features of equity capital, it did not imply government ownership in the banks, unless the bank would be unable to meet the conditions set for the capital injection. Almost all of the offered 8 billion was in fact subscribed by the banks, even though many smaller banks refused the offer. Second, a wholly new body, Government Guarantee Fund (GGF) was created with the task "to safeguard the stable functioning of the deposit banks and the claims of the depositors" and with an authorization to use up to FIM 20 billion for the support operations deemed necessary.

In 1992 the situation deteriorated rapidly in parts of the banking system. A large number of larger savings banks were on the brink of collapse by the Summer. The newly created GGF stepped in in June merging the problem banks and a number of

other savings banks to form the Savings Bank of Finland (SBF). In the process existing capital was fully written off to cover losses and SBF was transformed into a joint-stock company in government ownership. By the end of the year GGF had given SBF bank support of the order of FIM 12 billion in the form of purchases of preferred capital certificates and subordinated debt. In November 1992 also a relatively small commercial bank STS-bank came close to a collapse.<sup>38</sup> The Government took over the risky assets while the remaining assets were sold to a private bank.

In the Winter 1992/93 confidence in the Finnish economy weakened considerably. The credit ratings of the State of Finland, major Finnish banks and non-financial corporations had been lowered several times during 1992, the premium of Finnish Government debt in foreign currency rose to almost 1 percentage point by the end of the year, and anecdotal evidence suggests that the Finnish banks as well as large corporations were unable to borrow from abroad long term and faced significant rationing in short-term borrowing as well. To stop the erosion of confidence in the banking system, the parliament published in February 1993 an unprecedented resolution, in which it undertook to guarantee that the Finnish deposit banks would be able to meet their contractual commitments in time.<sup>39</sup> Simultaneously the government bank support authorization was doubled to FIM 40 billion.

Through 1993 the situation stabilized but almost all banks continued to make substantial loss. Also the prospects of the newly created SBF remained bleak, and the Government decided in October 1993 to sell the sound SBF assets to the savings banks' four major domestic competitors. The risky assets were transferred to an asset management company operating under government guarantee. Even though the overall economic situation improved, banks still made substantial losses both in 1994 and 1995.

During the five-year period 1991 through 1995 the Finnish deposit banks, including the government-run asset management companies formed from the failed banks' bad assets, posted losses of the order of FIM 66 billion.<sup>40</sup> This is over 8 per cent of the banks' total assets at the end of 1990 and exceeds clearly the regulatory capital of deposit bank groups of FIM 54 billion at the end of 1990. With losses of this magnitude most if not all banks had failed without a massive government intervention. The total bank support commitment of the authorities (capital injections and guarantees) amounted to over FIM 80 billion at the end of 1995. The final cost of the support operations for the public sector has been estimated by the GGF at FIM 45–55 billion, or some 10 per cent of annual GDP. This is by a large margin the highest bank support undertaking in the countries having experienced banking crises in the last decade; for example in Sweden the total support commitment amounts to some 6 per cent of GDP.

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<sup>38</sup> Also STS-bank was originally a savings bank. In the course of the 1980s it nevertheless gradually separated itself from other savings banks and it was legally converted into a commercial bank as of the beginning of 1990.

<sup>39</sup> The Swedish parliament had adopted a similar resolution already in November 1992. It was in a sense an even more radical measure, as unlike in Finland, there was no formal deposit insurance scheme in Sweden.

<sup>40</sup> This overestimates the consolidated losses, as about 4 billion of the losses by the savings banks are due to loss of value of their investments in Skopbank.

Table 1. **Banks' cumulative losses and public bank support 1991 through 1995**

	Total assets(TA) bill. of FIM 31/12/90	Regulatory capital (RCAP) bill. of FIM 31/12/90	Losses 1991-1995			Bank support					
						total (incl. guarantees)			of which paid-out		
			billions of FIM	% of TA	% of RCAP	billions of FIM	% of TA	% of RCAP	billions of FIM	% of TA	% of RCAP
Bank group <sup>1</sup>											
KOP	164	12.5	11.8	7.2	94.4	3.5	2.1	28.0	1.7	1.0	13.6
Unitas (SYP)	138	13.6	5.8	4.2	42.6	2.7	2.0	19.9	1.7	1.2	12.5
Postipankki	97	6.9	2.5	2.6	36.2	0.9	0.9	13.0	0.9	0.9	13.0
Savings Bank group	173 <sup>2</sup>	10.1 <sup>2,3</sup>	34.6	20.0	342.6	70.3	40.6	696.0	42.2	24.4	417.8
STS-bank	15	1.4	3.2	21.3	228.6	3.0	20.0	214.3	3.0	20.0	214.3
Cooperative Bank group	134 <sup>2</sup>	9.3 <sup>2,3</sup>	3.7	2.8	39.8	2.4	1.8	25.8	1.5	1.1	16.1
All deposit banks	724 <sup>2</sup>	54.1	61.6 <sup>2</sup>	8.3	116.3	82.7	11.4	153.0	51.0	7.0	94.3

<sup>1</sup> Bank groups consolidated

<sup>2</sup> Savings banks and SKOPBANK and cooperative banks and OKOBANK, respectively, consolidated

<sup>3</sup> Estimated

Bank losses and even more so bank support are very unevenly distributed. The savings banks, their central institution Skopbank and the STS-bank (which also was a savings bank until the change in the legal form at the beginning of 1990) account for over 60 per cent of the banking sector's total losses in 1991 through 1995 and for almost 90 per cent of the total bank support commitment of the authorities.

The banking problems have led to a large-scale restructuring of the banking system. As a direct consequence of the solvency problems, more than half of the savings bank units of the time were merged to form the Savings Bank Finland, which later was dismantled. The two major commercial (KOP and SYP) merged in the beginning of 1995. Also this can be seen, at least in part, as a response to the significant depletion of bank capital experienced in the crisis years by these banks, particularly by KOP. And all banks have been busy to cut costs by shedding labour, closing branches etc. For example, the number of bank employees declined by over 1/3 from the peak in 1989 by the end of 1995.

## 5.4 Interpreting the cycle

As noted above, the "financial factors" story can be conceptually decomposed into two elements, "the balance sheet mechanism" and "the intermediary mechanism". The former essentially says that the availability and cost of external funds is positively related to borrower net worth. Thus spending is constrained by the generated internal funds – cash flow – and collateralizable assets, the value of which crucially depends on asset prices. The intermediary mechanism says that at least a part of borrowers cannot perfectly substitute for intermediary finance, and therefore their spending decisions are affected by changes in the supply of intermediated funds. Of course, the two mechanisms are not truly independent but are likely to work simultaneously reinforcing each other. In what follows we discuss very briefly the likely role of borrower balance sheets and more in depth the likely role of banks' credit supply in the credit cycle of 1986 through 1995.

### 5.4.1 Borrower balance sheets

The evolution of many aggregate economic variables in the period of 1985–1995 certainly is consistent with a balance sheet mechanism in action. The period of rapid growth of private investment coincides with a rapid rise in asset values, favourable developments of cash flows, rising household incomes. Similarly the deep decline in investment is accompanied by falling asset prices, weak cash flow particularly after interest payments, and decelerating and in the end declining external finance. Correspondingly, residential construction and household expenditure on durables go hand in hand with changes in the real price of the main household asset, dwellings.



Figure 4.

### Stock prices, corporate cash flow and investment

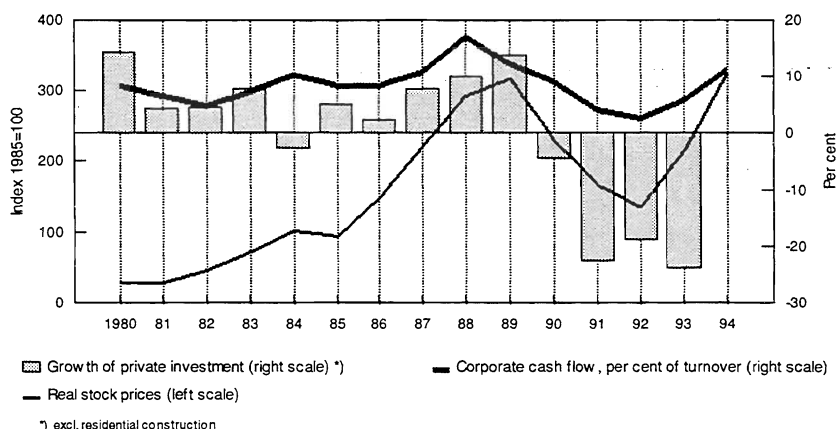
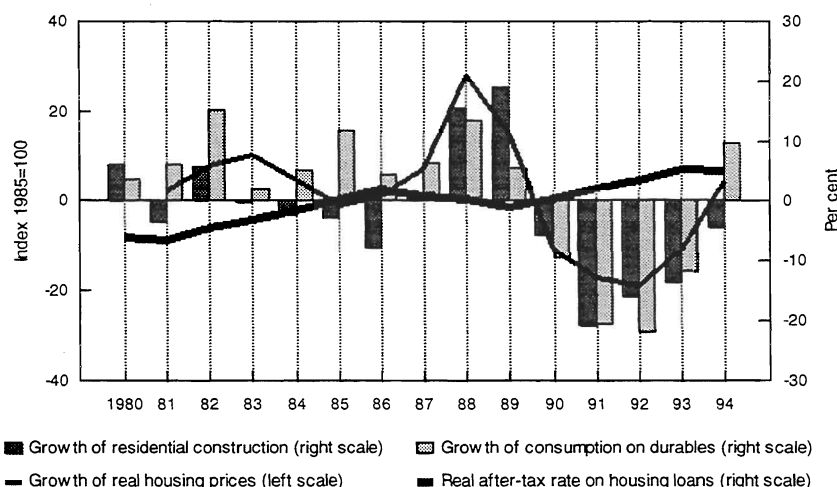


Figure 5.

### Housing prices, interest rates, residential construction and durables consumption



However, as such these patterns can also be consistent with the standard neoclassical explanation: investment is determined by marginal productivity of capital and cost of capital (approximated by the tax and inflation adjusted rates of interest). In this explanation high asset prices just reflect high future returns on the existing capital stock as do high cash flows. And the correlation of credit and investment is purely due to demand side effects. More careful analysis is obviously needed.

Several studies on investment behaviour with Finnish data prior to the financial liberalization suggest that private investment is affected by cash flows, see Koskenkylä (1985) for an analysis with aggregate data and Peisa and Soltila (1984) for an analysis with micro data. However, these results may be mainly due to the frictions of intermediation created by regulation, and the doubt remains that variation in investment opportunities was not adequately accounted for.

A couple of recent studies shed some light on the determinants of private investment in the boom-bust period. Kajanoja (1995) estimates three types of investment equations for both manufacturing and non-manufacturing sectors with quarterly data through the second quarter of 1993. Each of the "flexible accelerator",

"neoclassical" and "Tobin's-q" specifications contains also an indebtedness variable (the ratio of gross long-term debt to capital stock). Kajanoja finds that for the manufacturing sector indebtedness is of no consequence. However, investment of the non-manufacturing sector is significantly negatively affected by the debt ratio. And even quantitatively the effect on 1993 investment can be assessed non-negligible: investment had been 6–15 per cent higher, had the debt ratio been at the 1980 level. But, given the steadily increasing debt ratio in 1980 through 1992, changes in indebtedness as measured in the study cannot explain the rapid growth of non-manufacturing investment in the late 1980s.

Brunila (1994) investigates corporate investment with panel data on 280 large firms for the years 1985–1992. Investment opportunities are controlled for by sales growth and cost of capital by the average rate of interest on existing interest bearing liabilities. Both obtain significant coefficients with the expected signs. In addition, investment is affected positively by cash flow and negatively by indebtedness. Consistently with the aggregate time series results of Kajanoja, the indebtedness variable exerts a more powerful influence on the non-manufacturing firms, even though the effect now is significant for both types of firms. The difference may reflect the nature of the available collateral assets in the two sectors. The cash flow effect is equally important for the two sectors quantitatively as well as in terms of statistical significance. Consistently with panel data studies on other countries, the effects of both cash flow and leverage are highly non-linear in the degree of leverage: the impacts are clearly stronger for the high-leverage firms.

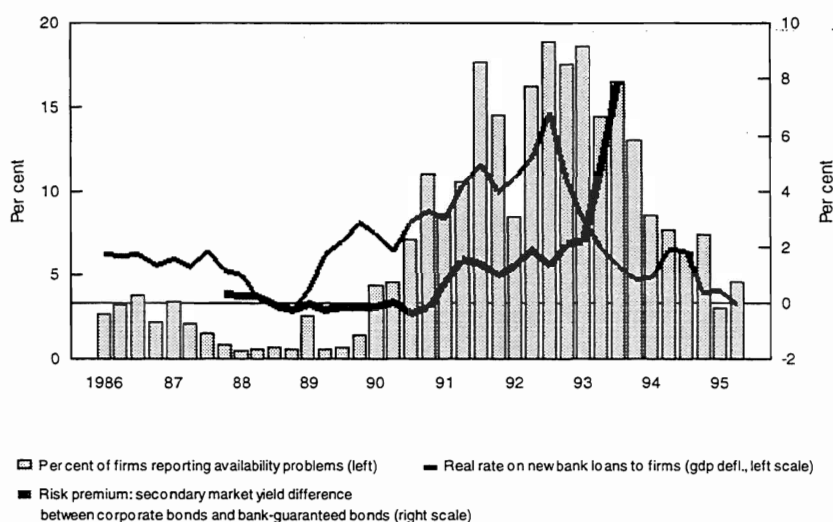
Surveys on management sentiment yield results that are broadly consistent with the above econometric findings. Thus in the aftermath of deregulation, with asset prices on a steep rise and cash flows improving, perception of financing as a constraint on production was very rare among manufacturing firms. The situation is a complete mirror image some years later.<sup>41</sup> Surveys also indicate that availability of acceptable collateral has been the most important perceived problem in obtaining finance in the time of low asset values.

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<sup>41</sup> Actually the share of firms that report that financing is a constraint on production is relatively small even in the worst times. The importance of the financial difficulties of the firm sector may, nevertheless, be underestimated in the survey, as the sample covers only manufacturing firms with a strong overrepresentation of large enterprises.

Figure 6.

### Financial difficulties, interest rates and corporate risk premium



The little data that exist on corporate bond premia suggest that significant risk of corporate defaults was started to be perceived in early 1991 with the steep decline of production, increasing numbers of bankruptcies and continuous decline of asset prices. The secondary market for corporate bonds, thin even in the best of the times, more or less disappeared in the winter 1992/93, suggesting of extreme risk perception.<sup>42</sup> Anecdotal evidence corroborates the message of the corporate risk premia: availability of external finance was very tight for even larger corporations in the winter 1992/93 to alleviate substantially by the subsequent autumn.

As a whole, there seems to be little doubt that a balance sheet mechanism has been in action in the recent Finnish cycle, even though its exact role is difficult to assess. The overall behaviour of the Finnish economy appears to resemble very much that of other countries having been subject to large scale swings in asset prices and cash flows recently, see Jonung et al. (1994), Borio et al. (1994).

#### 5.4.2 Intermediary behaviour

Should the supply of intermediated funds have been a significant factor affecting the boom-bust cycle, one would want to find expansionary shocks to intermediaries in or prior to the boom period and contractionary shocks in or prior to the bust period. For the former financial liberalization provides an obvious potential series of shocks. For the contractionary period, several negative shocks can be contemplated: the tighter credit policies of 1989, the tighter capital regulations in 1991 and (for the cooperative and savings banks again in 1994), depletion of capital since 1991, the resource consuming restructuring and rationalization measures particularly since

<sup>42</sup> Data on secondary market yields of corporate bonds have been collected since 1988, although the number of bonds for which quotations exist has always been small. Furthermore, the data is contaminated by the fact that some of the bonds have had bank guarantee. Thus the recorded price premia are likely to underestimate the cost of bond finance to the corporates.

1992, and the impact of realized losses and their consequences for bank managers' risk attitudes. In addition, the cuts in the tax privileges of bank deposits may have made a contribution.

In what follows the role of banks' credit supply is discussed both in the period of rapid growth and the subsequent period of deceleration and decline of credit. We consider specifically the composition of firms' and households external finance, the issuance of corporate bonds, bank interest margins and an indicator of bank risk. After summarizing the aggregate level evidence a brief look is taken at the behaviour of individual banks (bank groups).

### Composition of external finance

When a given class of intermediaries is hit by shocks to any of the above factors, one would expect, *ceteris paribus*, a change in the share of financing provided by this source of funds. Similarly one would expect to see a change in the relative price of financing. However, the latter is more difficult to identify, given the measurement problems associated with the multidimensional nature of financial prices and the potential for rationing phenomena. Importantly, changes in borrower credit quality should not imply any change in the share of any single source of finance or its relative price, unless a some class of borrowers can rely only on a given source of credit.

The composition of the firm sector external funds is perhaps the most useful piece of financial mix information. As firms have in principle many alternative sources of funds, the relative contribution of bank financing should change in a systematic way when the supply of bank credit is hit by shocks.<sup>43</sup> Also the evolution of households' credit may be of some interest, although the scarcity of alternatives probably makes it difficult to distinguish between demand shocks and shocks to a particular type of supply.

It seems obvious that while the liberalization of capital controls and lending rates and the emergence of the money market implied a positive shock in the supply of credit to the private sector in general, it affected most significantly bank lending.

In part the liberalization of capital movements in 1986 and 1987 eased the direct foreign currency borrowing of firms from abroad. But this effect probably was not very important as such, as only large firms could and did resort to that type of financing; even in the early 1990s the firms borrowing directly from abroad numbered under 100. And these large firms had even earlier been granted licences for capital import. A more important immediate consequence of the liberalization of capital controls was that banks could now intermediate long-term foreign-currency financing from abroad to their corporate customers. Thus the liberalization of capital controls provided banks a new source of funds to finance supply of credit.

Similarly, the emerging money market benefited probably more banks' financing possibilities than the availability or cost of short-term credit for firms from the securities market. Only large firms can use commercial paper, at least without credit

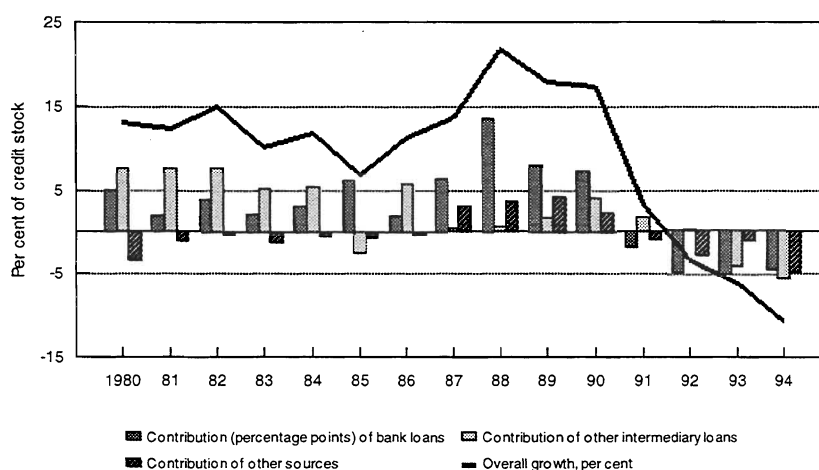
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<sup>43</sup> There are two problems of measurement which may distort the evolution of the mix of particularly the firm sector external finance, as the net changes have to be calculated from the stocks. First, exchange rate changes, particularly since 1991 change the markka values of the stock without any effect on financial flows. Second, the effect of write-offs must also be estimated. These have been taken into account in Figure 7.

enhancement by the banks, and these firms had very likely faced the least constraints on short-term credit earlier. Finally, the abolition of the lending rate controls also eased banks' credit pricing while leaving other sources of credit unaffected.

Consistently with these predictions about the effects of financial liberalization, the composition of firms' external finance moved strongly towards bank finance in 1987 and 1988. Most of the substantial growth comes from this source. In 1987 this may have been partly due to "reintermediation" as financing moved back to banks' balance sheets from the finance companies owned by the banks. These companies had expanded rapidly in a couple of preceding years as a way to circumvent the still existing lending rate regulation. But also in 1988 bank lending was by far the dominant element of overall credit expansion.

Figure 7. **Firms' external finance**



The growth of private sector credit started to show some deceleration from the beginning of 1989, but firms' external finance (mainly credit) nevertheless increased quite robustly in 1989 and almost all year 1990. However, the share of bank credit declined in both years, suggesting that the supply of this type of finance became in relative terms more scarce. The introduction of the special cash reserve requirement is a readily available explanation for the relative decline of bank lending in 1989, but probably not anymore in 1990 when the cash reserve deposits were paid back.

In 1990, supply of may have been constrained by the imminent tightening of capital regulations in the beginning of 1991. But this shock to the supply of bank credit may have been less important for the share of bank loans than two other factors. First, possibilities of direct foreign finance improved as constraints on the sales of markka bonds abroad were lifted. Second, finance from the insurance companies in the form of relending of pension contributions became attractive

relative to bank credit, as the regulated price of this finance did not increase along with the general level of interest rates.<sup>44</sup>

In the first year of declining output 1991, bank lending to firms came to a virtual standstill, while borrowing from other financial institutions, particularly from insurance companies continued at a relatively robust pace. Again the continued relative decline of the price of insurance company relending may account for a part of the decline in the share of bank lending. However, no obvious positive shocks can be attributed to the other alternatives to bank credit. Thus it is likely that the supply of bank credit was hit by a negative shock. As already noted, the tightened capital regulation is one such potential shock. But it cannot be excluded that also prospects of loss of capital due to weak profitability played a role as well, given the increasing amounts of non-performing loans and bankruptcies through the year.

In 1992, bank credit contracted strongly while stocks of other types of credit remained largely unchanged. A strong negative shock to the supply of bank credit looks therefore likely. Given the unprecedented losses of the banks as a whole and a complete wiping-out of the capital of the savings banks, capital insufficiency is a natural candidate cause of the decline.<sup>45</sup> In addition, the restructuring going on in the savings bank sector may have negatively affected credit supply. At the latest in 1992 senior bank managers probably also had become aware that large losses imply significant changes in bank management; risk attitudes probably changed as a result.

In 1993 the picture started to change as large firms increased their external funding from the bond market and the stock market. Also in 1994 large firms raised substantial amounts of equity capital. Bond financing nevertheless collapsed, presumably in response to the steep rise of long-term interest rates in the Spring. Bank lending continued to decline in both years, however. But so did borrowing from other financial intermediaries and in 1994 also directly from abroad. Although in 1993 a further decline of the supply of bank credit looks quite possible, and presumably for the same reasons as in 1992, also other factors very likely contributed. In particular, the open sector dominated by large corporations started to recover improving corporate cash flows and balance sheets with a positive effect on their creditworthiness. On the other hand, the non-manufacturing sector dominated by small businesses continued to be depressed, with demand for credit and borrower quality weak. This asymmetry – most likely not present during the early phase of the recession – may imply that low demand for all types of intermediated credit and the

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<sup>44</sup> The automatic relending of pension contributions is a special feature of the Finnish earnings related pension system. The firms that make their pension contributions are entitled to borrow 2/3 of the contributions at regulated rates, provided they have acceptable collateral to provide. In 1990, finding adequate collateral (bank or equivalent guarantees, good real estate collateral) did not seem to be a problem. Banks and a government agency selling such guarantees started to raise their guarantee fees only in 1991. The median fee for manufacturing firms of 50 basis points in 1989 and 1990 more than doubled to 120 basis points by 1993.

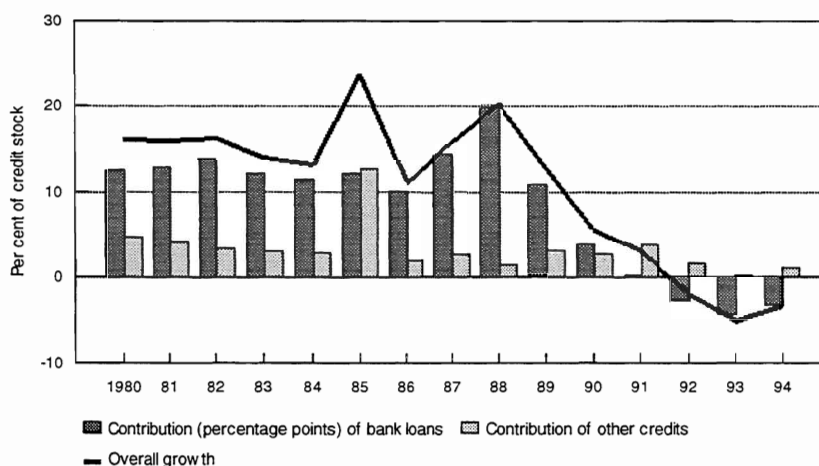
<sup>45</sup> It seems rather clear that by the first half of 1992, banks had become aware that huge losses of capital cannot be avoided. Prospects for raising private capital were weak for even the banks that in principle could issue equity and corresponding tier-I capital instruments. Furthermore, although the Government had promised a capital injection of FIM 8 billion into the Finnish banks, its terms were regarded as rather stiff in the banking community. And the terms, at which additional support would be available from the GGF – although not well articulated by the authorities – were considered very harsh. The treatment of the Savings Bank of Finland in the Autumn of 1992 very likely confirmed these conjectures.

weak quality of the borrowers dependent on such credit were the reasons for declining bank and other intermediated credit in 1993 and particularly in 1994.

The composition of household borrowing is consistent with the above interpretation of firm sector borrowing mix. In the wake of the early measures of deregulation, bank lending to households increased rapidly while other financing was relatively modest. However, since 1989 the contribution and share of bank loans declined, falling to essentially zero in 1991, just as in the firm sector. And from thereon households' borrowing from the banks has declined. However, as noted, the information value of household borrowing composition is likely to be less than that of the firms. The main alternative sources for households are namely various subsidized public credit schemes – chiefly for housing. Given their advantageous terms, these loan facilities are usually used up to the regulated maximum. Bank loans are thus a more expensive residual source of finance. Therefore change in the mix is likely to reflect more the overall demand conditions than the relative supplies.

Figure 8.

### Household credit

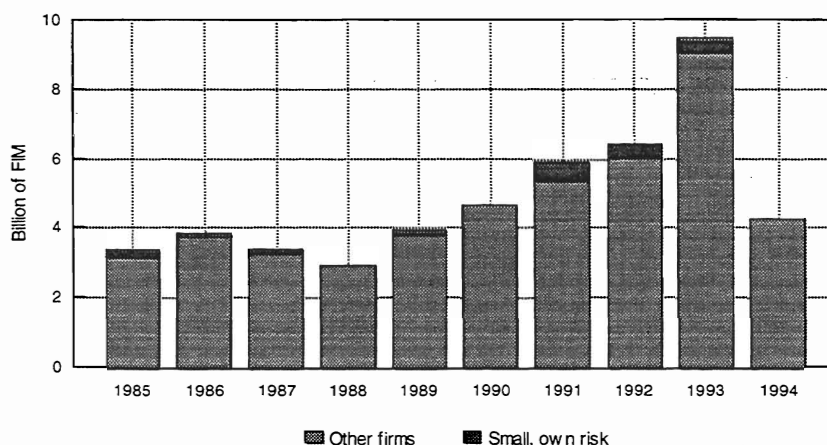


Also the evolution of gross issues of corporate bonds fits well to the above story about shocks to bank credit supply. Despite the rapid overall credit growth in 1987–1988, bond emissions in fact declined. They started to increase in the same time as bank lending was decelerating in the wake of the special cash reserve requirement in 1989. And the rapid growth (relative to earlier years) continued in 1990–1993. Although in part this may have been due to the noted lifting of restrictions on the sales of markka denominated bonds, substitution for increasing scarce bank lending cannot be excluded as a reason.<sup>46</sup>

<sup>46</sup> However, only a small fraction of bonds have ever been issued by non-listed corporations without bank or equivalent guarantee. Thus bond finance has been a true alternative to bank and other intermediary loans for a very small corporate segment only.

Figure 9.

### Issues of corporate bonds



Small own risk = public bonds issued by non-listed companies without guarantee  
 1994: no distinction available between public and private issues

As noted, the decline in bond issues in 1994 probably was due to the sharp increase in long-term interest rates in the Spring 1994. But also easing of borrowing needs due to strong cash flows of the large (mainly export orientated) corporations that can borrow in the bond market in the first place was a likely factor. At any rate, resorting to the bond market was not necessary to replace potentially lacking finance from banks. The general improvement of the availability of finance and its terms is supported also the surveys about management sentiment discussed earlier.

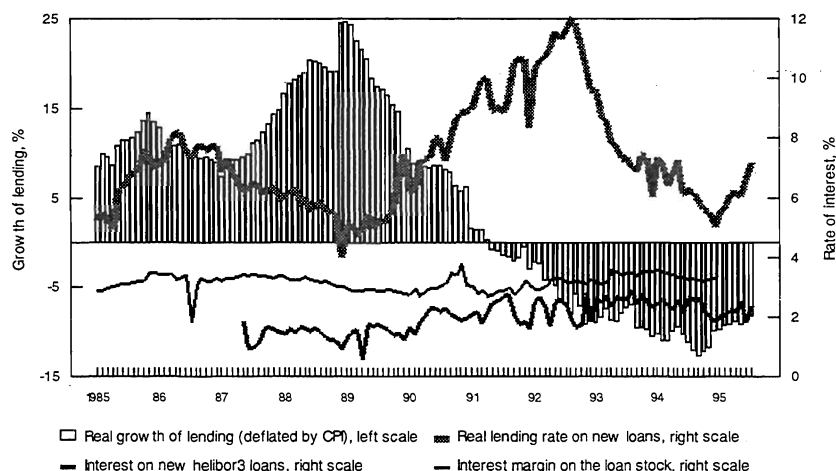
#### Price data

Bank margins (the differences between lending and funding rates) may be informative about the relative roles of supply and demand shocks. In the absence of rationing phenomena and assuming the borrower quality constant, an outward shift in the demand for bank loans should raise the margin, *ceteris paribus*, and outward shift in the supply should lower the margin, *ceteris paribus*.



Figure 10.

### Bank lending and interest rates



The margin between the average rate on the bank loan stock (markka loans) and the average funding cost (markka funding), for which data exist even prior to deregulation, declines from 1987 until 1990, and increases thereafter until late 1993, after which it again has been on a downward path.<sup>47</sup> The time path suggests that positive supply shocks were dominant from the times of major liberalization measures until at least the peaking of loan growth around the year shift 1988/89, which coincides with the bottoming out of the average ex post real rate on new loans. This margin also suggests that the decline of loan growth in 1989 and 1990 reflected equally slackening demand as declining supply, while in 1991 through late 1993 negative supply shocks dominated. From 1993 onwards weakness of demand more than weakness of supply is suggested as the cause of declining bank credit.

Unfortunately the overall interest margin is moved also by changes in the yield curve. A better indicator of the relevant relative price of bank credit may be the margin between the average rate applied to new loans linked to a given money market rate and the relevant reference rate. The most representative such margin is the one between the variable-rate loans with the linkage to the three-month money market rate, data on which exist from mid-1987. It behaves somewhat differently but leads broadly to the same conclusions as the overall margin of markka intermediation. Despite a very rapid growth of credit until the end of 1988, this margin did not rise but if anything showed a marginally declining trend. From some time in 1989 until mid 1993 this margin was on the rise to decline thereafter again. The main difference between the two margins is that the margin on new loans suggests that negative supply shocks dominated declining demand already from 1989.

The conclusions based on interest rate margins have, nevertheless several caveats, which need to be kept in mind. The most important problem is that not only shocks to the supply of credit and shocks to the willingness of the potential borrowers to borrow (pay for loans) move the margin. Also borrower quality is reflected in the

<sup>47</sup> A steep temporary hike in the margin can be observed towards the end of 1990. It is presumably reflects more or less solely the effects of the expected change in the taxation of interest incomes on deposits in January 1991. A substantial part of the maturing long-term tax free deposits with relatively high rates were not renewed in 1990 but the funds were left in low-yielding transactions accounts to wait for the new high-yielding savings outlets subject to a low source tax.

margin. Thus low margins in the growth period and high margins in the contraction period may reflect (perceived) good borrower quality in the good times and bad quality in the bad times rather than changes in supply. The only way to distinguish between the two is to explicitly analyze borrower quality, which hardly can be done with aggregate data. Fortunately there exists a micro data study about this period.

Murto (1994) investigates the pricing of bank loans with data on some 1900 savings bank customers in the period of 1987–1992. He finds that after controlling for many characteristics of the borrowers (and also some characteristics of the lending banks) the margin over and above the reference rate was lower in the boom years than in the early crisis period covered by the study. This is consistent with our aggregate observation that margins were on the decline during the boom years and on the increase during the early crisis years. It thus supports the above conclusion that supply shocks are at least in part behind the margin movement both in the boom period and in the crisis years.

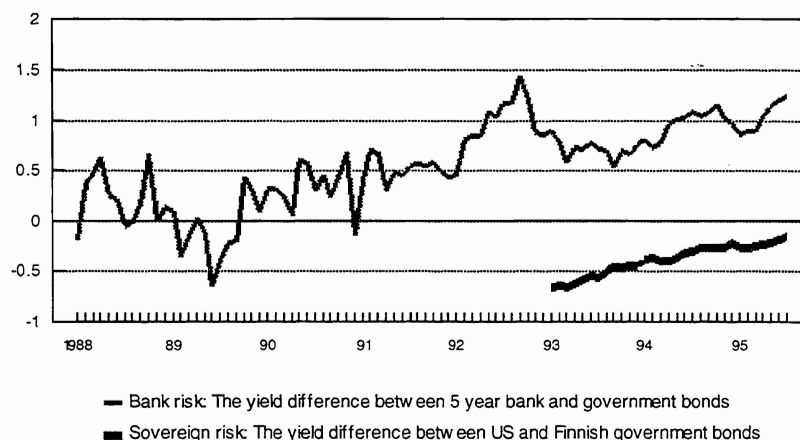
A second problem is that the increase in the margins in 1989–1993 is likely to underestimate both the weakening of borrower quality and tightening of credit supply. First, adverse selection and moral hazard problems are likely to be more important in bad times than in good times. Therefore rationing as a means to control for them is likely to increase in bad times. Second, the loans extended in the crisis period include also renegotiated loans to ailing customers. Often times renegotiation implies lower rates. Thus the rates applied to other (healthy, new) customers must be clearly higher than the average rates, while such a difference is unlikely to exist in good times.

Another type of price data concerns the risk premia applied to banks' uninsured funding. For the Finnish banks such data of reasonable quality exist only for 5-year bonds guaranteed by the banks, the yields of which can be compared with the yields of corresponding government debt. The time series of such a spread variable is broadly consistent with the pattern of the private sector financing mix. Until late 1989 there was no systematic bank credit risk over and above the government risk. In late 1989 through early 1992 the yield premium hovered at around 0.5 percentage point to increase in 1992 to clearly over 1 percentage point. Thus in the period of rapid expansion, no premium can reliably be observed while in the period of deceleration and contraction the premium was high.<sup>48</sup>

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<sup>48</sup> The behaviour of this measure of bank risk is somewhat puzzling in 1994, however. It seems to increase even though banks in the same time reported of easing financial conditions, and banks' relative share in corporate borrowing did not decline anymore. The main factor is likely to be that the rapid growth of bank deposits (subject 100 % deposit insurance) made banks less dependent on purchased funds. Thus even though buyers of money market instrument may have attached a higher default premium than before, banks lending opportunities have not been constrained by finance as deposit funding has been plentiful. In part also the decline in the sovereign risk of the State of Finland could explain why the increase in the bank – State of Finland spread is not reflected in the perceived difficulties of funding in the banking sector.

Figure 11.

**Bank risk and sovereign risk**A preliminary conclusion

Based on aggregate level observations about the composition of firms' and households external finance, the corporate bond market and price data on bank lending and funding, a tentative interpretation emerges about the evolution of banks' credit supply.

Starting in 1987, financial liberalization was followed by an outward shift in the supply of bank lending. The positive supply shocks dominated until some time in 1989. After the peaking of the growth rate of bank lending at the end of 1988, both demand and supply schedules started to move inward. Through 1990, the last year of overall growth of credit, negative supply shocks increased in importance, and continued to contribute to the decline of credit at least in 1991 and 1992, perhaps also in 1993. From 1993 onwards weak demand and questionable borrower quality were likely to be behind the continued decline of the stock of bank loans.

The patterns of lending growth and interest margins suggest that in the expansion phase financial liberalization very likely increased bank lending rather directly through the impact on the availability and cost of banks' refinancing both in the domestic money market and in the foreign capital market. But whether moral hazard associated with potentially underpriced bank liabilities or changes in banks' lending policies due to increased competition or simply myopic expectations contributed to the speed of credit growth cannot be assessed on the basis of the aggregate observations. Excluded it is not. At any rate, the findings by Vesala (1995b) suggest that bank competition increased in the second half of the 1980.

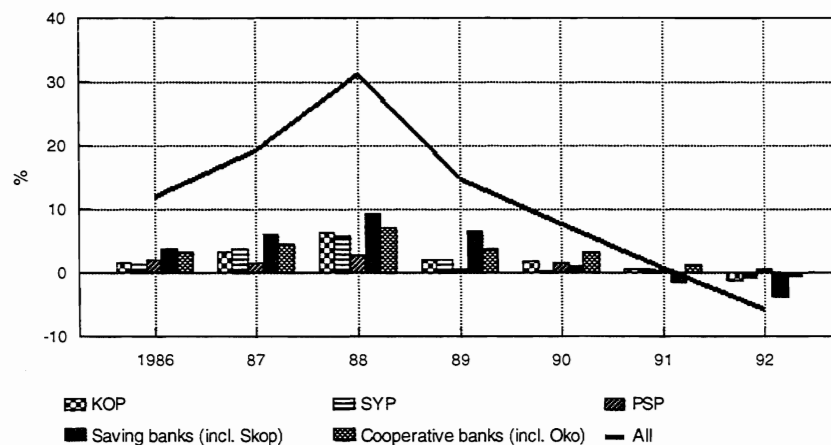
Similarly, in the contraction phase several potential explanations exist for a leftward shift in the banks' credit supply. Tightening of capital regulations, the substantial depletion of bank capital, changed risk attitudes and disturbances caused by restructuring are all possible explanations of the negative supply shocks in this period. Thus, in particular, a credit crunch due to bank capital problems seems possible in 1991 and 1992. The results of the only study that has attempted to discover a relationship between bank capital and lending with Finnish data are consistent with this conjecture. Following the approach of Bernanke and Lown (1991), Soltila and Vihriälä (1992) find a statistically significant negative

relationship between the growth of lending by individual savings banks in 1991 and their projected capital adequacy indicator. However, the effect was even smaller than that found by Bernanke and Lown. Furthermore, the analysis suffers from a very inadequate treatment of the potential demand factors, and there is no attempt to account for differences in borrower quality.

#### A glance beyond the aggregates: diversity of bank behaviour and risk taking

The overall evolution of bank credit hides very disparate speeds of credit extension by different banks. As noted, the savings bank group (the savings banks and their central bank Skopbank) expanded credit far faster than its competitors in the boom period. The difference is particularly pronounced in 1989, when the savings banks continued rapid expansion while the other banks already decelerated lending significantly. This is clearly problematic from the point of view of the above hypothesis that financial liberalization as such is the only positive supply shock of the boom period. The new opportunities to finance credit expansion were open to all banks.

Figure 12. **Contributions of bank groups to growth of bank credit**

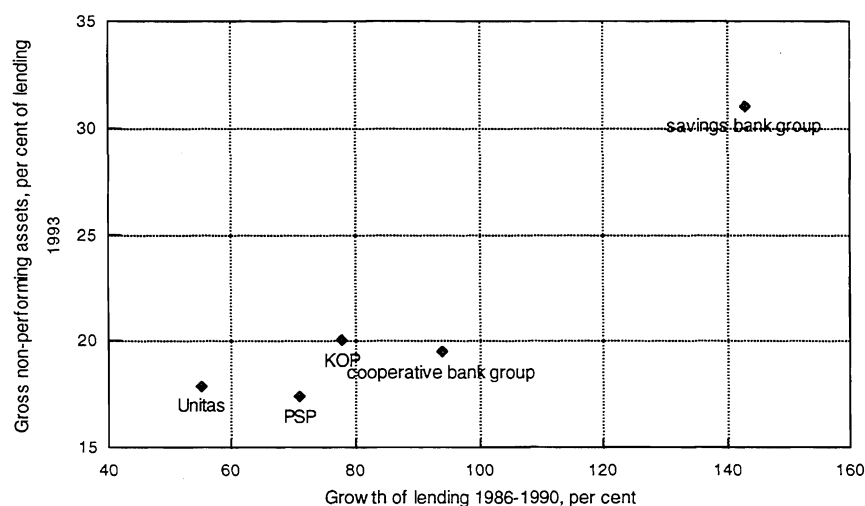


One can argue that the development of the money market favoured particularly the savings banks and the cooperative banks which did not have a direct access to central bank facilities. These two classes of banks may also have obtained particular advantage from the liberalization of capital controls, as these banks' traditional clienteles (households and small businesses) had not earlier had any access to foreign borrowing unlike the large industrial firms which relied on commercial banks for their bank finance. But even these explanations fall short of accounting for the observed differences among banks. In particular, they do not explain why the cooperative banks did not seize the new opportunities as the savings banks did.

Another important aspect about credit growth becomes obvious when the differences among banks are considered: rapid growth was very risky. A clear positive relationship exists between the materialized risks in the crisis period and the speed of credit expansion in the boom period. The savings banks (including

Skopbank) expanded far faster than other major banks, and ended up with largest shares of problem assets.

Figure 13. **Lending growth and non-performing assets**



An analysis of individual savings and cooperative banks confirms this conclusion. Solttila and Vihriälä (1994) find that even after controlling for the sectoral composition of bank lending and a number of other factors, the speed of credit growth in the boom period is the main factor to explain the bankwise differences in the share of problem assets in the crisis period. Among the savings banks hardly any other factor is of importance.

The moral hazard explanation of excessive risky lending would require that the banks, which took most risk were also banks with weakest net worth. In fact, this seems to be the case in the Finnish credit boom of the late 1980s. Plotting the rate of growth of bank lending in the second half of the 1980s against the average operating profit of the in the first half of the 1980 shows that the bank groups which chose to expand lending most also were the bank groups with the weakest underlying profitability (Figure 14).<sup>49</sup> The most expansive savings bank group stands out also as the least profitable one.

A popular explanation of the rapid growth of lending by the Finnish savings banks in the 1980s is that the savings banks tried to overcome what was perceived to be a serious profitability problem in the early 1980s by expanding the scale of operation in order to lower unit costs. A good opportunity to do so was perceived when deregulation lifted constraints on non-deposit funding as well as unleashed repressed demand for credit. Kuusterä (1995) provides ample documentation of decisions consistent with this hypothesis.

How does this explanation square with the moral hazard explanation? At a first glance, the "lower unit costs through growth" story would seem to be very different from the moral hazard hypothesis and the related managerial theories. The moral

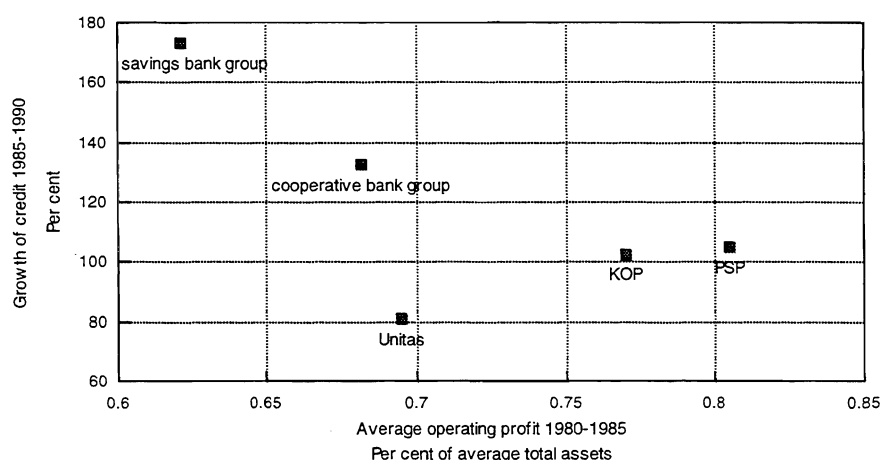
<sup>49</sup> The operating profit excludes depreciation, extraordinary items and taxes, the two of which have varied a great deal in part to minimize taxes. Operating profit is likely to be the best available measure of a bank's underlying profitability and thereby also "charter value".

hazard hypothesis explains rapid growth of lending by deliberate risk-taking facilitated by inadequate pricing of bank funding while the popular explanation refers to reduction of unit costs through growth and is silent about credit risk. But the two stories share essential features. Both require that the lenders to the banks do not price the funds they provide too high, otherwise financing the new business opportunities would not be profitable. The stories share also the prediction that high costs imply more lending. The only real difference is whether the bankers perceived lending to be risky or not. Should one assume that bankers always are aware that lending is associated with credit risk, one might actually regard the two stories as essentially the same.

But banks differ also in other respect than just costs or underlying profitability. In particular clientiles are different in terms of geographical location and sector. Such differences need to be taken into account to be able to infer about the moral hazard hypothesis.

Figure 14.

### Bank profitability and lending growth in the 1980s



Also the deceleration and contraction of credit took place rather differently in different banks. Following the slower than average deceleration of lending in 1989 and 1990, the savings banks cut lending very strongly in 1991 and in 1992.<sup>50</sup> Given that these banks faced the gravest capital adequacy problems, a capital crunch seems a possible explanation (Figure 15). But equally well a credit crunch for other reasons than capital insufficiency is possible. The savings bank group also was subject to the most stringent supervisory actions of all banks, as Skopbank was taken over by the Bank of Finland in 1991 and a major part of the individual savings banks ended up in government ownership in 1992. As a result, additional risk taking by these institutions was presumably strongly constrained and the radical restructuring measures of these failed institutions may have disturbed their lending business significantly.

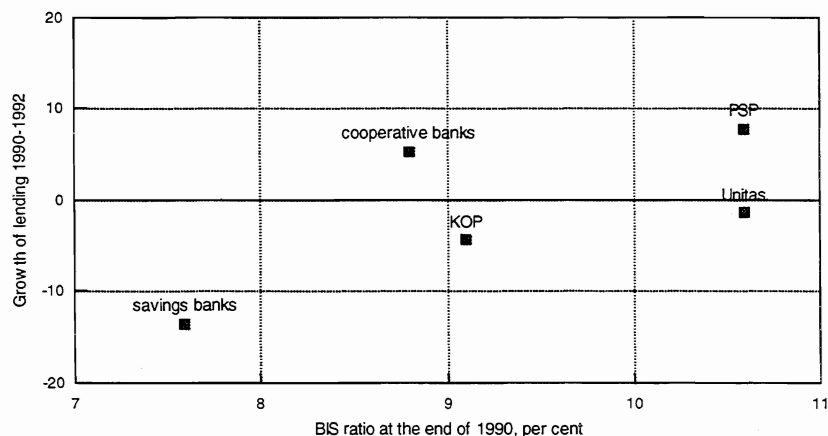
But, as noted different banks have had somewhat different clienteles as well, and this may at least partly explain the observed bank-wise differences. In particular, the savings banks may have had more customers in the sectors and areas most severely hit

<sup>50</sup> After 1992 assessing the evolution of credit by individual institutions is difficult given the drastic changes in the banking structure.

by the recession: real estate and services sectors and towns and regions which grew most rapidly in the boom period. Thus both demand (customers' willingness to pay for credit) and borrower quality may have declined more among the savings banks than among other banks. Clearly, to isolate the effect of bank capital and other bank characteristics, these factors have to be incorporated into the analysis.

Figure 15.

### Capital ratios and lending growth in the early 1990s



### Real effects of bank lending?

Even if it could be established that banks' credit supply has been hit by significant shocks either in the boom period or in the bust period or both, such shocks may not be important from the point of view of real outcomes. First, hardly any agent is fully dependent on bank credit. It is indeed clear from the data reported above that substitution has taken place. The question thus is to what extent substitution can and does mitigate the effects on real decisions of shocks to banks' supply of credit. Second, variation in spending due to other factors than the cost and availability of external finance may be quantitatively much larger than that due to these financial factors.

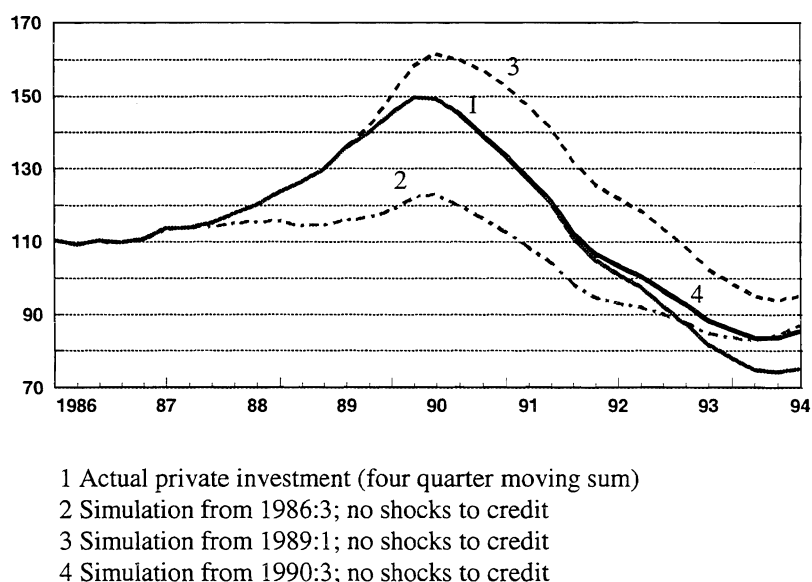
The traditionally predominant position of deposit banks as sources of funds for the private sector in Finland suggests that the scope for substitution must be much less in Finland than, say, in the United States. Shocks to banks' credit supply should thus be more powerful in Finland. Given that even some studies with recent US data have found quantitatively significant real consequences of banking problems, one would expect that at least in the distress period of the 1990s shocks to banks' credit supply could have had observable effects on spending. However, precisely in the same time the borrower quality and probably willingness to borrow also declined. Thus, as noted earlier, analysis that combines borrower quality and bank characteristics is needed. That requires in practice firm level (preferably panel) data.

But some insight into the role of bank credit may also be gained from aggregate analysis. Saarenheimo (1995) provides a relevant such exercise. He examines in a VAR framework the relative roles of money (M2) and bank loans (the sum of markka and foreign currency loans to the private sector) in the determination of private fixed investment with data of the first quarter 1970 through the second quarter 1994. The basic result of the analysis is that, even after allowing for the contribution of money

stock and the loan rate, bank credit exerts a significant independent effect on investment in dynamic simulations. Money and credit are strongly contemporaneously correlated but the importance of credit remains even if all of this correlation is attributed to shocks in money. However, money loses all of its effects on investment if the "ordering" is the other way round.

Simulations in which the shocks to credit are set to zero from a given quarter onwards suggest that had no credit shock taken place since 1986:3, investment had hardly increased in the boom years and had ended up in 1993 and 1994 slightly higher than in reality. Zeroing the shocks since 1989:1 would have resulted in substantially higher investment in all years 1990 through 1994. However, if only the shocks since 1990:3 had been eliminated, the deviation of investment from the true path had been much smaller.

Figure 16. **Private investment; actual and simulated**



Conditional on the assumption that the estimated shocks to bank credit indeed represent supply shocks, Saarenheimos results suggest that changes in the supply of bank credit can explain a substantial part of both the rapid growth and steep decline of investment in the boom-bust period. However, in the years of the banking crisis shocks to credit supply appear to have been of relatively modest magnitude. Furthermore, in the light of earlier discussion, it is unlikely that all shocks to Saarenheimos credit equation are due to changing bank behaviour. Thus in particular the quantitative significance of a "credit crunch" caused by banking problems may have been limited.



## 5.5 Conclusions

There is little doubt that a "financial accelerator" based on the borrower balance sheet quality and cash flow has played a role in the makings of the credit cycle of Finland in 1986–1994. Given the highly non-linear effects predicted by theory, the balance sheet mechanism can be assumed to have been especially important in the transformation of the economic downturn into a deep and long recession.

However, more research needs to be done to assess the importance of the weakening of firm and household balance sheets and cash flows relative to the standard mechanisms of cyclical variation based on interest rates and income and profitability expectations. Given the nature of the balance sheet factors, the best insights probably can be gained by analyzing micro data rather than aggregate time series alone.

In the light of aggregate and some bank-group level observations, it seems also plausible that changes in the credit supply of financial intermediaries have contributed to the credit cycle. Financial liberalization undoubtedly created a positive shock to the supply of bank credit. Similarly, a series of negative supply shocks seem capable of explaining at least a part of the decline in bank credit subsequently, i.e. a credit crunch is quite possible.

But many issues remain unclear. Why was the reaction of credit growth to liberalization so strong and why was it so unequal among the banks? Were the obvious impulses stemming from better financing possibilities augmented by distorted incentives to take excessive risks? Some broad observations suggest that such moral hazard may have been in action.

Similarly the period of declining bank credit is associated with many questions. Although the preliminary aggregate level analysis gives some support to the credit crunch hypothesis, its importance relative to the balance sheet mechanism is very difficult to establish, particularly as borrower quality weakened in the same time as banks' credit supply was hit by potentially important negative shocks. Even less can immediately be said about the relative importance of the potential causes of a credit crunch.

Understanding the role of the banks in the credit cycle clearly requires further analysis. Given the nature of the problem such analysis hardly can be conducted with aggregate data. Again examination of the behaviour of individual banks over the period of interest is required.

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