



Yale SCHOOL OF MANAGEMENT
Program on Financial Stability

EliScholar – A Digital Platform for Scholarly Publishing at Yale

YPFS Resource Library

9-20-2007

Three Episodes of Financial Fragility in Norway Since the 1890s

Karsten Gerdrup

<https://elischolar.library.yale.edu/ypfs-documents/10383>

This resource is brought to you for free and open access by the Yale Program on Financial Stability and [EliScholar](#), a digital platform for scholarly publishing provided by Yale University Library. For more information, please contact ypfs@yale.edu.



BANK FOR INTERNATIONAL SETTLEMENTS

BIS Working Papers

No 142

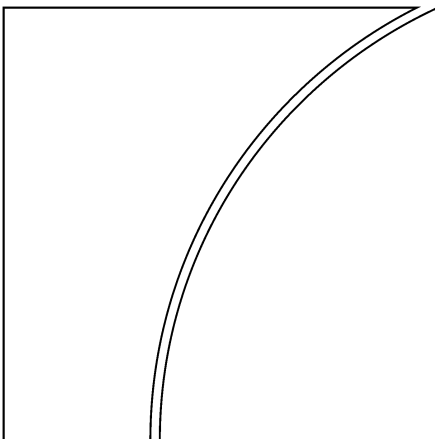
Three episodes of financial fragility in Norway since the 1890s

by Karsten R Gerdrup*

Monetary and Economic Department

October 2003

* Central Bank of Norway (Norges Bank)



BIS Working Papers are written by members of the Monetary and Economic Department of the Bank for International Settlements, and from time to time by other economists, and are published by the Bank. The views expressed in them are those of their authors and not necessarily the views of the BIS.

Copies of publications are available from:

Bank for International Settlements
Press & Communications
CH-4002 Basel, Switzerland

E-mail: publications@bis.org

Fax: +41 61 280 9100 and +41 61 280 8100

This publication is available on the BIS website (www.bis.org).

© *Bank for International Settlements 2002. All rights reserved. Brief excerpts may be reproduced or translated provided the source is cited.*

ISSN 1020-0959 (print)

ISSN 1682-7678 (online)

Abstract

This paper provides for the first time a comparative study of three major banking crises in Norway (1899-1905, 1920-28 and 1988-92), and presents financial and macroeconomic data spanning more than 130 years. Financial sector development appears to be closely linked to booms and busts in economic activity during these years. The boom periods that preceded each of the three crises all have some common features: they were characterised by significant bank expansion, considerable asset price inflation and increased indebtedness. The non-financial sector increased its debt only slightly more than its income during the first two boom periods, but subsequent deflation increased its debt burden. A puzzle in the two first boom periods was that the commercial bank equity-to-total-assets ratio increased markedly. Nonetheless, the commercial banks were severely affected in the each subsequent bust. Possible explanations are provided, but this puzzle calls for more research. Altogether, a strong causal link between financial fragility and banking crises is suggested. The crises occurred in different institutional environments and monetary policy regimes, and the role of these is explored and policy lessons are drawn. In particular, the close link between monetary and financial stability is highlighted.

Table of contents

1.	Introduction	1
2.	Structural aspects of the Norwegian financial system in the 19th century	3
2.1	Norges Bank and the silver/gold standard.....	4
2.2	The banking sector	6
3.	Banking crises in Norway – stylised facts	7
3.1	Overview of banking crises in Norway.....	7
3.2	The banking crisis of 1899-1905.....	8
	Macroeconomic factors in the 1890s.....	8
	Build-up of financial fragility from the mid-1890s.....	9
	Competitive pressure.....	9
	Banks’ balance sheet	9
	Asset price inflation	9
	Indebtedness	9
	Special factors – high risk associated with loans to the real estate sector	10
	The crisis.....	10
	Macroeconomic factors	10
	Resolution	13
3.3	The banking crisis of 1920-28.....	14
	Macroeconomic factors during WW1	14
	Build-up of financial fragility during WW1	15
	Competitive pressure.....	15
	Banks’ balance sheet	15
	Asset price inflation	15
	Special factors – high risk associated with lending during the war	18
	The aftermath of the war and the crisis of 1920-28	18
	Macroeconomic factors	18
	Unwinding of financial fragility	19
	Resolution	19

3.4	The banking crisis of 1988-92	21
	Macroeconomic factors – from a stable to an unstable macroeconomic environment.....	21
	Build-up of financial fragility in the mid-1980s.....	22
	Competitive pressure	22
	Banks' balance sheet.....	22
	Asset price inflation.....	22
	Indebtedness	23
	Special factors – deregulation and weak supervisory authority	23
	The crisis	23
	Macroeconomic factors from 1986	23
	Unwinding of financial fragility	23
	Resolution	26
4.	Financial fragility.....	27
4.1	Can the financial fragility approach explain the occurrence of banking crises?	28
	Common features.....	28
	Does financial fragility build up frequently?.....	30
	Can macroeconomic declines alone explain the occurrence of banking crises?	30
	The puzzle – why did the commercial bank equity-to-total-assets ratio increase in the first two boom periods?.....	31
4.2	Differences in macroeconomic policy	31
4.3	Institutional framework, financial safety net and moral hazard	33
	Prior to the crisis of 1899-1905	33
	Prior to the crisis of 1920-28	33
	Prior to the crisis of 1988-92	33
5.	Policy lessons.....	34
5.1	Stable macroeconomic environment.....	34
5.2	Macroprudential regulation and supervision	35
6.	Summary	36
	Appendix: Data sources	38
	References	40

1. Introduction¹

The last banking crisis in the Nordic countries ended 10 years ago. Since then, a rapidly growing literature has sought to explain the causes² and the effects³ of the crisis. Most of this literature emphasises the role of financial liberalisation, which underpinned a boom and bust cycle in credit, asset prices and leverage.⁴ Different shocks, such as tighter monetary policy and tax reforms – both of which increased the real after-tax interest rate – and declines in exports, have been seen as important factors triggering and reinforcing the bust in the Nordic countries. Relatively little attention has been devoted, however, to the causes and the effects of earlier banking crises.⁵ I believe there are additional lessons to be learned from Norwegian banking history.

Since the late 19th century, Norway has experienced three major banking crises, which have necessitated interventions by Norges Bank (NB) and the government. *The first banking crisis* was triggered by a real estate crash in 1899 and was largely confined to banks in Oslo,⁶ but credit conditions throughout the country were affected. *The second banking crisis* erupted in 1920, and continued for most of that decade. *The third banking crisis* followed the deregulation of the financial system and capital movements. It began in 1988 when several small banks started to record high losses, and became systemic in 1991 when the capital of the largest banks was all but wiped out.

This paper presents for the first time financial and macroeconomic data spanning more than 130 years. This allows me to study stylised facts about booms and busts both with and without crises. Although these episodes happened in different institutional environments and monetary regimes, and many factors should be taken into account to obtain a complete picture of these episodes, I will focus on the *common* causes. Kindleberger (1996, page 17) put it this way: “Individual features of any one crisis will differ from those of another: the nature of displacement, the object or objects of speculation, the form of credit expansion, the ingenuity of the swindlers, the nature of the incidence that touches off revulsion. ... the more something changes, the more it remains the same. Details proliferate; structure abides.”

In particular, I consider whether the financial fragility approach⁷ can explain the occurrence of banking crises in Norway in a fruitful way. According to this approach, banking crises and macroeconomic fluctuations are inextricably linked, and banking crises are a response to previous “excesses”.⁸

¹ Correspondence: Norges Bank, Bankplassen 2, 0107 Oslo, Norway; Tel: +47 22 316 440; E-mail: karsten.gerdrup@norges-bank.no. I am grateful to Claudio Borio for giving me the opportunity to visit the BIS and Konstantinos Tsatsaronis for many detailed comments and useful suggestions during the process. In addition I would like to thank Jan T Klovland, Gunnvald Grønvik, Ola H Grytten, Bill English, Knut Sandal, Andrew Filardo, Trond Borgersen, Bent Vale, Jacob Gyntelberg and Henning Strand for useful comments on earlier drafts, and comments from participants at the historical monetary group meeting at Norges Bank in January 2003. The views expressed herein are those of the author and do not necessarily reflect those of the Bank for International Settlements or Norges Bank.

² Just recently, two new papers have been prepared: Steigum (2003) focuses on the role of the monetary policy in the Norwegian banking crisis, and Sandal (2003) on resolution methods and costs in the Nordic countries. Pesola (2001) studies the role of macroeconomic shocks in the Nordic countries. Englund (1999) focuses on the causes of the Swedish banking crisis.

³ Hoggarth and Saporta (2001) present empirical evidence on the costs of banking crises since the 1970s, including the crisis in Norway.

⁴ Similar indicators have been used in different forms in empirical studies that have looked for determinants or early warning indicators of banking crises in a broader set of countries. See for example: Demirguc-Kunt and Detragiache (1997, 1998), Kaminsky and Reinhart (1996), Kaminsky (1999), Hardy and Pazarbasioglu (1999) and Hutchison and McDill (1999). Borio and Lowe (2002) find by using ex ante information and focusing on cumulative processes that a measure of credit gap, equity price gap and exchange rate gap (individually or combined) provides useful signals of banking crises. Bell and Pain (2000) provide an overview of leading indicator models of banking crises.

⁵ One exception is Herrala (1999), who studies banking crises in Finland in the period 1865-1998.

⁶ Oslo was named Kristiania at the time.

⁷ The tradition of the financial fragility approach is old, but its importance may have increased following the deregulation of financial markets and capital movements (Goodhart (2003)). Fisher (1933) was an early proponent of the financial fragility approach. Minsky (1977) and Kindleberger (1978, 1996) are later, highly influential, proponents. Davis (1995) describes this approach in more detail.

⁸ I do not make a statement about whether financial cycles are the result of irrational behaviour or not. In contrast to the traditional proponents of the financial fragility approach, there are also a number of papers which explain financial cycles without requiring that people, at least not individually, behave irrationally. Herring (1999) and Herring and Wachter (1998)

The process is initiated by some “displacement”, which leads to improved economic outlooks and better profit opportunities, leading to higher investment spending. Individuals and firms seek to take advantage of the new profit opportunities. Expansion of bank credit feeds the boom by supporting spending and by contributing to the success of new projects of various quality. Borrowers bid up the price of financial and real assets. Increased value of wealth contributes to increased spending and makes it easier to borrow against ample collateral. Financial institutions, non-financial firms and households overstretch their financial resources, leading to increased financial fragility and thus reduced robustness against adverse shocks. Overinvestment will eventually lead to lower profits than expected. A change in the perception of the future outlook, an interest rate increase or some adverse economic shock finally ends the boom, and leads to an unwinding of real and financial imbalances built up in the boom. In the bust, highly indebted borrowers become unable to meet their obligations. Borrowers can be forced to liquidate assets, precipitating a crash in asset prices and reducing the net worth of borrowers. The result is particularly severe for highly leveraged banks, which during the expansion extended loans to increasingly less creditworthy borrowers.

In order to assess whether the financial fragility approach matches the Norwegian experience, I take a number of steps.

First, I construct indicators that highlight the different aspects of this approach. This includes:

- *Number of banks*: The development in the number of banks is used as a crude measure of changes in the competitive environment (Graphs 3.2.5, 3.3.5 and 3.4.5). A rapid increase in the total number of banks is taken as an indication of an environment that may foster “excessive” competition. The reason for this is that the new banks to a greater extent than existing banks may be motivated to fight for market share without taking appropriate account of risk (eg by lending to risky borrowers discredited by established banks), thereby motivating existing banks to do the same. Informational problems may be particularly severe in cases where banks expand into new business and geographical areas about which they have little prior knowledge. Additional evidence on the competitive environment is provided.
- *Banks’ balance sheet*: The development in real bank lending is used as one indicator of banks’ overall lending policy stance (Graphs 3.2.6, 3.3.6 and 3.4.6). The development in the deposits-to-loans ratio is used as a second indicator of the lending policy stance (Graphs 3.2.7, 3.3.7 and 3.4.7). A reduction in this ratio reflects a decision to expand more than the limit that deposits set. This decision may have been motivated by easy and cheap access to alternative sources of finance. Finally, the development in the equity-to-total-assets ratio is analysed (Graphs 3.2.8, 3.3.8 and 3.4.8). A reduction in this ratio reflects higher leverage and a motivation to increase risk-taking. Arguably, this may at least be the case in commercial banks, because their owners have a limited liability.
- *Asset prices*: Different indicators of asset market activity and price developments are presented for the different episodes, since I have not been able to construct indicators spanning the whole period analysed (Graphs 3.2.9, 3.3.9 and 3.4.9).
- *Non-financial sector indebtedness*: If the non-financial sector (non-financial companies, households and municipalities) increases its debt more than nominal incomes, it becomes vulnerable to unexpected declines in economic activity or prices. Banks are affected by their borrowers’ total indebtedness. Hence, debt from all sources is included (privately and state-owned banks, non-bank financial institutions, foreign banks, bond market) and measured as a percentage of nominal GDP (Graphs 3.2.10, 3.3.10 and 3.4.10).

Second, I consider whether the behaviour of the indicators of financial fragility is consistent with the financial fragility approach. The role of different macroeconomic factors is expected to differ in each

provide a rationale, “disaster myopia”, that can explain why risks can be systematically underestimated during booms and overestimated during downturns. A possible explanation of financial cycles which focuses on the role of collateral is given by Kiyotaki and Moore (1995). Bernanke and Gertler (1989, 1990) show that, because of moral hazard, the net worth of borrowers’ or banks’ solvency can affect macroeconomic performance. A strengthening (weakening) of borrowers’ net worth resulting from a boom (bust) can thus stimulate (dampen) investments and propagate the good (bad) times. Borio et al (2001) argue that the financial system can amplify swings in the macroeconomy and sow the seeds of widespread financial instability, and that an important source of this amplification is the inappropriate responses by financial market participants to changes in absolute risk over time.

episode, but the nature of financial sector development and its interaction with economic activity should be the same. The degree of financial fragility is thus expected to increase in each boom, possibly reinforcing the boom, and the banking crisis is expected to reflect an unwinding of financial fragility in each subsequent bust.

Using the indicators above, I would expect an increase in the number of banks, including branches, during a boom in economic activity. Further, banks are expected to increase their lending (in real terms) by much more than the earlier trend, and overstretch their financial resources by increasingly finding other sources of finance than customer deposits or bidding up the price of such deposits. Bank equity is expected to decrease as a percentage of total assets during this process. The equity-to-total-assets ratio has, however, a caveat. Since I am not in a position to adjust total assets according to the risk inherent in the balance sheet, this indicator may be difficult to interpret. For example, an increase in the equity-to-total-assets ratio at a bank does not reflect lower risk-taking and higher cushions against future losses if the bank's risk-taking more than outweighs the higher ratio. The development in asset prices is, according to the financial fragility approach, closely linked to the boom in the financial sector and economic activity. An asset price boom without a bank lending boom is not judged to lead to a significant increase in financial fragility. An asset price boom may, however, underpin a bank lending boom (or vice versa). This paper does not try to make a distinction between "an asset price boom" and "a lending boom". The level of financial fragility during a boom is expected to increase if non-financial sector indebtedness increases markedly.

When the boom ends, the number of banks is expected to decrease because of bank failures and mergers and acquisitions involving weak banks. Real bank lending growth is expected to subside. Banks are expected to increase their deposits-to-loan ratio, as other sources of finance become expensive or absent. The equity-to-total-assets ratio may first decrease because of high losses (or increase if total assets fall more than equity because of a liquidity drain), and later increase as the banks adjust their balance sheets. Asset prices are expected to decline in the course of the bust. Non-financial sector indebtedness may first increase because of a decline in nominal incomes (or lower growth), but later decrease as this sector also tries to reduce the burden of the debt.

Third, I consider whether such episodes have occurred frequently. A high degree of financial fragility may by itself be sufficient to trigger a crisis. Even so, the causal link between financial fragility and banking crises may still be weak if episodes of financial fragility occur often.

Finally, to control for other factors, I investigate whether a strong (exogenous) macroeconomic decline unaccompanied by the unwinding of financial fragility may create a banking crisis. Banking crises have coincided with exceptionally strong macroeconomic declines.

In short, the data largely confirm a strong causal link between financial fragility and banking crises. Indicators of fragility behave in a way broadly consistent with the hypothesis processes (see also Graphs 4.1-4.6). In addition, severe macroeconomic declines unaccompanied by the unwinding of financial fragility appear not to be sufficient in creating banking crises.

The paper is organised as follows: Section 2 gives a brief description of some structural features of the economy at the time of the first banking crisis, especially the operation of the silver and gold standard. Section 3 gives an overview of the evolution of banking crises and problems in Norwegian banking history, before describing the three major banking crises in more detail. The role of the different institutional environments, monetary regimes and other specific macroeconomic factors is explored, and an overview of the crisis resolution techniques employed is presented. Section 4 evaluates whether the stylised facts can support the financial fragility approach. Section 5 is devoted to policy lessons. I summarise the key findings and conclusions in Section 6.

2. Structural aspects of the Norwegian financial system in the 19th century

This section provides a short description of the structure of the financial system in Norway as a background to the discussion of the three banking crisis. The main features are the role of NB and the operation of the silver and gold standard, the evolution of supervision and regulation, and developments in the structure of the banking sector. Later structural changes will be described in Section 3.

2.1 Norges Bank and the silver/gold standard

After more than four centuries of union with Denmark, Norway regained its independence in 1814 as a result of the Napoleonic wars. It had to form, however, a loose union with Sweden which lasted until 1905. A Constitution was written in 1814 as part of the nation-building, and the establishment of a central bank was envisaged.

NB was established in 1816 as a limited liability company,⁹ in part with private shareholders, and began normal operations in 1818. At the time of establishment, silver provided by private investors was supposed to form the basis of NB's capital base. However, this had not succeeded, so the government had imposed a so-called "silver tax", which provided the central bank with the required amount of silver, and "depositors" had been given shares in return.

NB was established before any private bank was in operation in Norway, and the use of notes and coins was very limited. Extension of long-term loans constituted an important part of its operations, eg as a means of increasing the amount of notes and coins in circulation. As part of this, NB established over time several branches. NB evolved gradually into a more typical central bank during the 19th century in the sense that extension of short-term loans and the use of the discount rate as a monetary policy instrument became more important. Notes first became fully convertible into silver in 1842. The silver standard was replaced by the gold standard in 1874. The year after Norway joined the Scandinavian currency union.

In general, the silver or gold standard was characterised by the free flow of specie between individuals and countries, ie no restrictions on import or obstacles to export of specie, and the maintenance of fixed values of national currencies in terms of silver or gold and therefore of each other.¹⁰ Central banks had two overriding objectives: to secure convertibility of notes into specie and to avoid note issuance in excess of the legislative level (ie avoid too low note reserves).¹¹ Of course, these two objectives were interrelated because the legislative level of maximum note issuance was linked to the central bank's specie reserves, and if the central bank's note reserves were low, the institution became vulnerable to a loss of confidence. Countries that suspended convertibility were usually punished hard. Norway never suspended convertibility of notes into gold before 1914, but followed the "rules of the game". These "rules" meant that the central banks should let balance of payments surpluses correct themselves by letting inflows of specie inflate the economy (reducing interest rates, increasing prices and wages), thereby reducing the surplus. In particular, inflows of specie should not be sterilised to reduce the impact on the money supply, which was done to a great extent in the interwar period by surplus countries like France and the United States.¹² Likewise, balance of payments deficits should correct themselves by letting outflows of gold contract the economy (increasing interest rates, reducing prices and wages), thereby reducing the deficit. The central bank could alleviate the adjustment process by using the discount rate actively to attract or repel short-term capital flows when the country experienced balance of payment deficits and surpluses, respectively. In addition to the effects of short-term capital flows, a discount rate increase (reduction) contributed to contracting (inflating) the economy. Import and export of specie could be avoided altogether if the exchange rate was not allowed to reach the gold points.¹³

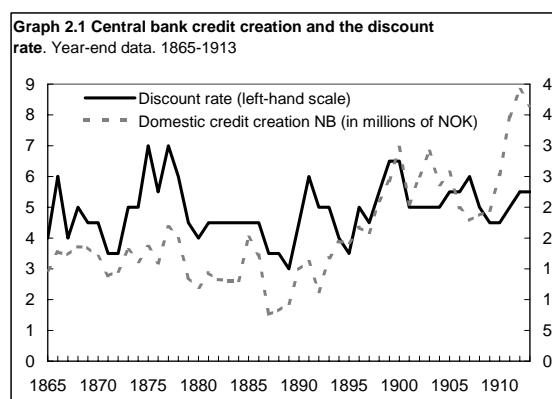
⁹ NB was nationalised in 1949.

¹⁰ Bordo (1984) provides an overview of the operation of the gold standard.

¹¹ The exact rules on the regulation of note issuance changed over time in Norway, but the changes usually entailed increased note issuance as a percentage of the specie and other foreign exchange reserves.

¹² Temin (1993) provides a more detailed description of the asymmetry between countries experiencing balance of payments deficits and surpluses. This asymmetry arose because consistently running a deficit threatened running out of gold or foreign exchange reserves, which meant that the country would no longer be able to maintain the fixed value of its currency. However, consistently running a surplus had little penalty, just the forgone interest from holding greater reserves, and possibly some inflation if the additional gold reserves were allowed to increase the money supply.

¹³ Ford (1960) illustrates the difference in the equilibrating mechanisms between the United Kingdom and Argentina before 1914. While short-term capital flows alleviated the adjustment process considerably in the United Kingdom because of well functioning financial markets, gold movements were the main adjustment mechanism in Argentina.



Sources: Klovland (1984); Statistics Norway; Norges Bank.

In the case of Norway, NB usually combined discount rate changes with direct intervention in the foreign exchange market by buying and selling foreign bills of exchange.¹⁴ Hence, the exchange rate seldom surpassed the gold points (Klovland (1995)). Graph 2.1 shows that there was a close relationship between central bank credit creation (which equals the monetary base minus central bank holdings of international reserves) and the discount rate. When the difference between the monetary base and central bank holdings of international reserves increased (ie credit creation increased) the discount rate was raised and vice versa. This increase in central bank credit creation could be due both to lower holding of international reserves (gold outflows) or a higher monetary base (high level of discounting at the central bank).

The Norwegian economy experienced cycles over the period 1865¹⁵ to 1914, with marked booms and busts in real GDP, private consumption and fixed investment (Graph 3.2.1). Fixed investment appears to have been an important driving force in these cycles, as the amplitude of the investment cycles was larger and the peaks and troughs of the cycles often led real GDP and private consumption. Fixed investment related to the real estate sector was important in the late 1890s-early 1900s, a point elaborated below.

Expansions and contractions in the nominal money supply, the price level¹⁶ (Graph 3.2.2) and banks' balance sheets (at least in nominal terms) (Graphs 3.2.6 and 3.2.7) appear to coincide with booms and busts in economic activity. An important mechanism through which this happened was the operation of the silver or gold standard. Norway being a small and open economy, changes in the price of eg fish, timber and lumber and the net income from shipping services had an important impact

¹⁴ Most short-term changes in NB's specie reserves took place at foreign commissaries. Up to one third of the stock of specie and foreign exchange reserves backed by specie could according to the law be stored in this way, thus earning interest income for the central bank. Specie was therefore relatively seldom physically shipped between Norway and other countries.

¹⁵ This year is the first for which we have official national account numbers.

¹⁶ Although there is no clear medium- to long-term movement in the price level, a certain pattern can be discerned. When the price level rose, it usually did so in booms, and when the price level declined, it usually did so in busts. The most persistent period with inflation was the four-year period from 1910 to 1913. Deflation, on the other hand, never lasted longer than two years. (The wholesale price index is, however, less erratic.) These price level changes may have had real effects because they may have acted as surprises for firms and individuals, and thus induced them to produce more in booms and less in busts. In addition, an unexpected rise in the price level may have reduced the real burden of debt, contributing to more borrowing and spending, and an unexpected decline in the price level may have increased the real burden of debt and decreased spending. Declines in the price level contributed also to reducing the net worth of borrowers, possibly increasing the number of bankruptcies and bank losses. Changes in the price level were probably not important for investment decisions, since it is the *expected* real interest rate that is important. For investment projects with a long horizon it is reasonable to argue that investors did not expect the real long-term interest rate to deviate much from the nominal long-term interest rate before WW1. However, for investment projects with a short horizon it could be argued that rational investors could expect real short-term interest rates to be lower in booms than in busts. However, for this to hold, investors had to have the proper information that could signal the state of the economy. Information was at that time scarce compared to now, and it is likely that it was extremely difficult to estimate changes in the price level. Further, even if the price level increased one year, the probability of a change in a particular direction the next year was not very high since the price level evolved in a relatively erratic way. Thus the short-term nominal interest rate was probably the relevant discount factor for projects with a short horizon.

on both economic activity and the balance of payments. Balance of payments surpluses contributed to specie or foreign exchange inflows and lower discount rates.¹⁷ When NB paid for the gold by issuing notes or buying foreign bills, the money supply and bank lending were boosted. A generally higher activity in the real economy, rising prices and asset price inflation raised the demand for money and encouraged discounting at the central bank. The central bank could discount more paper as long as its note reserves were not unduly low, and was in fact motivated to do so because it in that way could increase its own profits.

However, as a boom developed the demand for imports rose as well, both because more spending necessitated higher imports and because a higher domestic price level encouraged substitution into foreign-produced goods. Gold or foreign exchange inflows abated or turned into outflows as a result, and a need to increase the discount rate to attract short-term capital and contract the economy arose. If a boom went too far, perhaps because of too loose a monetary policy, a sharp monetary contraction would be necessary to avoid a loss of confidence. A sudden adverse shock to the terms of trade would by itself entail a monetary tightening. In addition, the discount rate could not deviate (very) much from the discount rate in other countries. As Norwegian paper was not considered a close substitute for that of other countries, perhaps with the exception of Sweden, NB had some autonomy in fixing the discount rate.

A boom could also be triggered by domestic supply side shocks.¹⁸ The central bank would increase the discount rate if the boom contributed to a balance of payments deficit brought about by higher imports, or if the boom entailed rapid credit expansion, raising the amount of discounting at the central bank and lowering central bank reserves.

NB had some discretion to extend credit as long as it had some reserves left and used this opportunity on some occasions to underpin confidence in the banking sector, to contain both widespread bank runs and capital outflows by foreign creditors. NB gained more discretion after a change in the law in 1892 that allowed it to extend loans in the form of short-term credit lines against collateral. Further, the issuance of notes became less restricted. Instead of a limit on note issuance, a fee was introduced to discourage note issuance over a certain threshold that was related to the central bank's specie reserves. A change in the regulation of the relationship between specie (and other foreign exchange reserves) and notes allowed an increase in NB's credit creation (Graph 2.1).

2.2 The banking sector

The number of private banks and the role of these banks increased during the 19th century (Graph 3.2.5), reflecting a rising level of financial sophistication and NB's policy of reducing its role in the provision of long-term credit to non-financial companies. There were two types of private banking institutions, savings and commercial banks. For most of the 19th century, these had different objectives, a different corporate structure and were subject to different regulatory and supervisory frameworks. The first savings bank, Christiania Sparebank, was established in 1822, and the first commercial bank, Christiania Bank og Kreditkasse, in 1848. In the intervening period, around 90 savings banks had come into operation.

Savings banks were organised as mutually held institutions, and they were supposed to fulfil a more social role in collecting and safeguarding "ordinary" people's money, and not involve themselves in risky lending. Hence, they became subject to some regulation and supervision as early as 1824. They were, for example, required to send annual reports to the Ministry of Finance. A separate financial supervisory authority, the Inspectorate of Savings Banks, was established in 1900.¹⁹

¹⁷ Norway had a balance of payments deficit during large parts of the specie era, because the surplus arising from shipping services was normally smaller than the deficit in the trade of goods. Capital inflows in the form of bonds issued abroad by the government, municipalities and the state-owned bank(s) contributed to sustaining the deficit.

¹⁸ Klovland (1995) shows that the correlation between the growth rate in the Norwegian economy and its trading partners was surprisingly low, most likely because domestic supply side shocks like climate changes for farmers, changes in the fish stock etc were important in shaping economic activity. After the turn of the 19th century, industrial production (chemical production etc based on hydroelectric power) gained a greater role in economic development, thus linking the Norwegian economy to the international economy.

¹⁹ The development of a financial supervisory authority since the 19th century is described in Ecklund and Knutsen (2000).

The savings banks were small single-office banks, and concentrated their activities in the local community. They extended to a large degree long-term loans against collateral.

Commercial banks were organised as limited liability companies, and according to the liberal ideology of the time they were supposed to operate freely just as any other non-financial firm. Placing deposits at commercial banks was supposed to be at depositors' own risk. Hence, commercial banks were not subject to any regulation or supervision. There were also no uniform accounting and disclosure standards in place. The first law for limited liability companies, which implied regulation of the establishment, organisation, operation, management, etc of commercial banks, was introduced as late as 1910. Commercial banks were single-office banks in the same way as savings banks, but their activities often stretched beyond their local community and they were usually larger than savings banks. They extended short-term loans to a greater extent than savings banks, often without requiring collateral.

In the period 1852-1903, there was only one state-owned bank in operation, Norges Hypotekbank. It was chartered to extend long-term loans, largely to farmers, and it funded itself mainly by bond issuance. Banks and limited liability companies were not allowed to issue bonds before 1897, and restrictions discouraged their use thereafter. The government, municipalities and state-owned banks were the main issuers, in particular before WW2. Bonds were normally issued abroad before WW1. Bonds did not become an important source of finance for banks before the 1980s.

3. Banking crises in Norway – stylised facts

3.1 Overview of banking crises in Norway

There were relatively frequent episodes of banking problems in the era of the silver and gold standard. The banking problems usually happened in downturns,²⁰ and the silver or gold standard exposed the Norwegian economy to financial conditions abroad.

- Savings banks were hit by tight liquidity and a high discount rate in the aftermath of the bursting of the railway bubble in the United States in 1857.²¹ A commercial bank increased its interest rate on deposits. This created a liquidity crisis for many savings banks, which had a cap on their interest rates. Many banks experienced runs, and banks withdrew loans.
- In 1864 a crisis erupted in Oppland, a rural district, after a sizeable non-financial company in the forestry, timber trade and manufacturing industries failed. This and other companies had expanded heavily in the latter half of the 1850s, during a sharp upswing in the timber industry and a real estate boom. The boom had peaked in 1860, and the subsequent protracted bust and deflation eroded the net worth of borrowers, leading to many bank failures.
- A period of strong growth in the early 1870s contributed to considerable overcapacity in many industries at the time of the turnaround in the international economy around 1874, and a long period of weak economic performance, monetary tightening and deflation followed in Norway as well as many other countries.²² After a brief upturn in the period 1879-81, a new prolonged downturn set in. Many banks recorded high losses or failed during the 1880s. Structural problems associated with the transition from sailing ships to steamships added to the economic problems in the south of Norway. The first commercial bank failure in Norwegian banking history occurred in Arendal in 1886.
- The banking crisis of 1899-1905 happened after the bursting of a real estate bubble in the summer of 1899. Commercial banks had grown rapidly during the boom of the latter half of the 1890s.

²⁰ This was also the case in US banking history (at least in the National Banking Era); see Gorton (1988).

²¹ Calomiris and Schweikart (1991) discuss this bubble from a US perspective.

²² Klovland (1989) suggests that the peak in real economic activity was as late as 1877 in Norway because of the sustained buoyancy of domestic demand.

The crisis was largely confined to banks in Oslo, but credit conditions throughout the country were affected. This episode can be characterised as the first major banking crisis.

The next two banking crises (1920-28 and 1988-92) were severe, because they were associated with unstable macroeconomic policy and currency problems as well.

The evolution of banking crises and their effects in Norway seems to emulate the main findings of Bordo et al (2001). By studying a cross-section of countries over 120 years, they found that the frequency of banking crises after the 1970s was almost the same as in the period 1880-1914, and that the frequency was even higher in the interwar period. The gold standard promoted a safe and sound macro policy, at least in the core countries, leading to relatively few twin crises (combined banking and currency crises) in the period 1880-1914 compared with that after 1970. Twin crises happened frequently in the interwar period. In contrast, banking crises and twin crises were almost non-existent in these countries in the quarter of a century after WW2. In this period, financial crises were confined to pure currency crises. Generally, financial crises have proved costly in terms of fiscal costs and/or forgone output. In the periods 1880-1913 and 1973-97 estimated GDP loss in recessions with banking crises were about 10 percentage points higher than in recessions without crises, and the cost of twin crises was even higher. There are also many studies that have tried to estimate the role of financial factors in macroeconomic development.²³ They have generally found that banking crises are indeed important, because they break down established relationships and information flows between banks and their borrowers.

In what follows, I concentrate on three major episodes in the Norwegian banking history, ie those of 1899-1905, 1920-28 and 1988-92.

3.2 The banking crisis of 1899-1905

Macroeconomic factors in the 1890s

An upturn started internationally in the autumn of 1895, after a two-year recession (Graph 3.2.1). The price level fell on average in the first half of the 1890s (Graph 3.2.2). NB's discount rate was decreased after January 1892, reaching its lowest point in 1895 (Graph 3.2.3). Exports rose sharply when the business cycle turned, and economic activity increased each year from 1894 to 1897. A sharp fall in exports brought about slower economic growth in 1898. Nonetheless, domestic spending continued to grow (Graph 3.2.1). The spectacular real estate boom that developed in large Norwegian cities from the mid-1890s was essential for the development in domestic demand and imports. The real estate boom in Oslo was reinforced by Parliament's decision in 1894 to resume the construction of railways from Oslo to a few other cities. This decision gave impetus to speculation in land property and the construction of new homes. Demand for bricks, lumber and other inputs for the construction sector rose. The economic development in the cities became broad-based and attracted new inhabitants, which increased on average by 5% per year during the 1890s (largely concentrated in the latter half of the decade).

Repatriation of incomes from shipping services and exports contributed to inflows of foreign exchange and an increase in the monetary base during large parts of the 1890s. A reflection of this development was that private banks had net foreign claims in 1899²⁴ (Graph 3.2.4). NB, following the rules of the gold standard, did not sterilise this inflow. It appears that monetary policy was too loose, however. NB appeared reluctant to increase the discount rate even at times when different indicators pointed to an overheated economy (Sundt (1901)). NB utilised the increase in the legislative level of note issuance, and the amount of discounting at NB increased rapidly. The discount rate increased from 4% to 5.5% in the course of 1898, eg because of declines in exports. The sharp increase in the price level in 1898 and rising nominal incomes added to the tight liquidity conditions in the money market. The discount rate was reduced somewhat in February 1899 because of (temporarily) high net incomes

²³ See for example Bernanke (1983), who focuses on the Great Depression. Calomiris (1993) gives a summary of the literature on financial factors in the Great Depression. Grossman (1993) found that the banking channel was important in the United States before 1914 (the National Banking era).

²⁴ This is the first year for which I have data.

from shipping services. The money supply increased rapidly (Graph 3.2.2) and as a result, NB's note reserves were frequently at low levels during the latter half of the 1890s.

Build-up of financial fragility from the mid-1890s

The banking sector was affected by monetary and business conditions in the same way as in previous booms. There were many signs of excessive risk-taking by banks and their borrowers, which reinforced the boom, but led to an increasingly fragile situation.

Competitive pressure

The number of commercial banks rose rapidly in the latter half of the 1890s, much faster than the previous trend (Graph 3.2.5). Six new banks were established in Oslo. They soon became important providers of credit to the expanding construction sector, manufacturing industries, brokers and stock market investors. Evidence points to an aggressive lending policy stance at the new Oslo banks. They were largely managed by younger people who had no memory of earlier banking problems, were less risk-averse, and fought aggressively for market share (Sundt (1901)).

Banks' balance sheet

Real bank lending growth accelerated in the latter half of the 1890s, and commercial banks increased their lending far more than savings banks (Graph 3.2.6). Deposits at commercial banks also increased more than at savings banks. In 1898, the amount of outstanding loans at commercial banks surpassed that of savings banks. Commercial banks increased their outstanding loans well in excess of what they collected in deposits (Graph 3.2.7). This development can largely be attributed to commercial banks issuing new share capital. The stock market was buoyant, and appears to have been highly willing to subscribe bank shares.²⁵ Hence, banks' external financial constraints were lessened and decoupled from deposits, thereby facilitating rapid expansion at the new banks. Equity increased markedly as a percentage of total assets in the boom (Graph 3.2.8). This development contrasts with conventional wisdom and the financial fragility story, because commercial banks seemed to increase their robustness against adverse shocks in the boom rather than reducing it. (I will come back to this puzzle in Section 4.1.) By contrast, savings banks could not take advantage of the buoyant stock market because they were mutually owned, and could largely only finance equity growth through retained earnings.

Asset price inflation

Real estate prices rose to unsustainable levels during the latter half of the 1890s. House prices accelerated (Graph 3.2.9), and rose as much as 27% in 1897 (Hanisch and Ryggvik (1992)). This development provided banks with ample collateral. Shares also rose rapidly in value, and the issuance of new shares rose year by year. The number of new real estate companies in Oslo increased from 16 in 1897 to 47 in 1898 and 52 in 1899. This development was supported by banks providing short-term loans for the purpose of purchasing shares against the shares as collateral.

Indebtedness

Non-financial sectors increased their indebtedness only slightly, and not more than the earlier trend.²⁶ The amount of outstanding commercial bank loans measured as a percentage of nominal GDP increased, however, markedly from 20% in 1895 to 27% in 1900 (Graph 3.2.10). In other words, the share of overall credit outstanding granted by banks rose markedly.

²⁵ Good stock market data are unavailable. The stock market was very dispersed and a large part of trading was unlisted, even though an increasing part of the trading became listed during the latter half of the 1890s. There is, however, evidence that markets were highly willing to invest in new shares. Shares were subscribed fast, and often oversubscribed (Kili (1996)).

²⁶ This is based on the development from 1890 to 1899. No data are available for the intermediate years for total non-financial sector debt.

Special factors – high risk associated with loans to the real estate sector

A change in the organisational structure of real estate companies may have contributed to higher aggregate risk-taking. The new real estate companies were often organised as limited companies, as opposed to the smaller personal firms that had been more common before.²⁷ A greater share of the downside risk was in this way shifted onto the banks.²⁸ This development was facilitated by a high willingness of investors to buy real estate shares.

The crisis

Macroeconomic factors

The situation in Norwegian financial markets became increasingly uncertain towards the summer of 1899. NB had low note reserves because of high credit expansion and was vulnerable to gold drains. The discount rate increased from 5% in February to 6% in March due to tighter liquidity conditions in the money market. Uncertainty spread and activity on the stock market subsided.

The failure of a large, highly leveraged, non-financial company, Chr Christophersen,²⁹ precipitated a crash in asset markets. Banks became reluctant to lend to real estate-related companies, and some companies became unable to obtain loans to finish construction work. Rumours about the health of the banks in Oslo made conditions in the money market worse, and short-term financing from abroad was cut off. The discount rate rose to an unprecedented level in October 1899 (6.5%). Great uncertainty in international financial markets and interest rate increases in many other countries also contributed to a relatively long period of high discount rates in Norway. During 1900 gold was actually shipped from Norway to both England and France, because the Norwegian krone was weak.

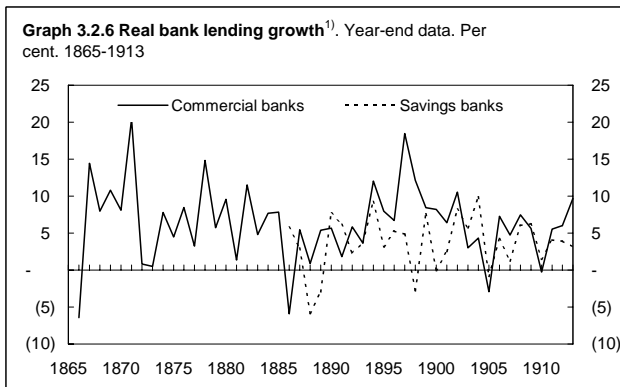
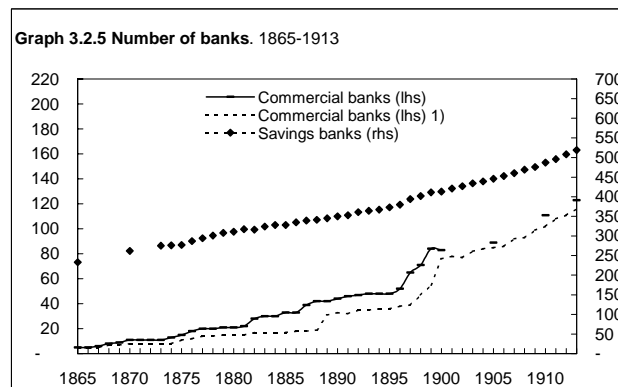
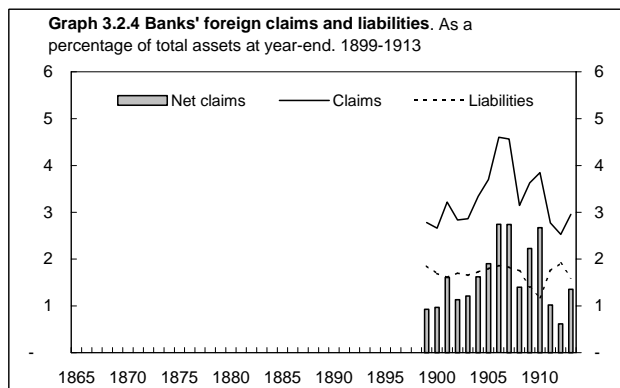
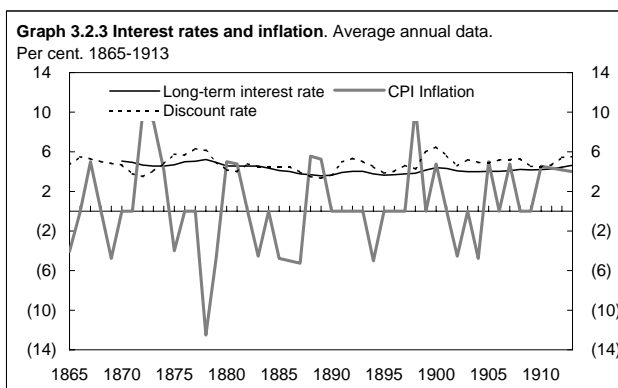
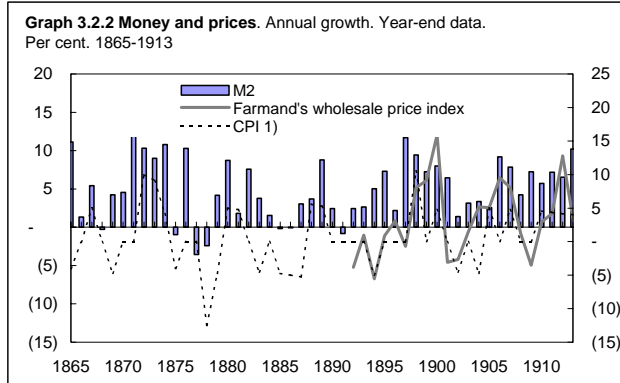
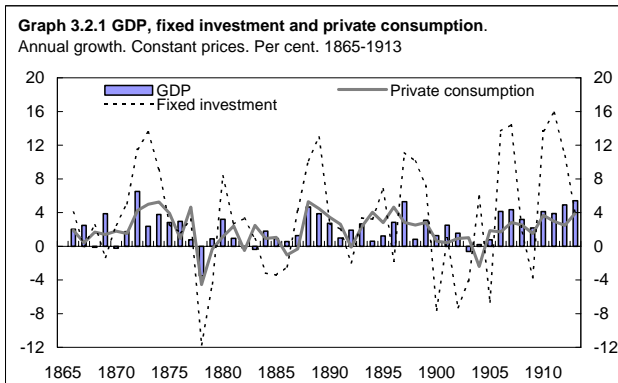
Although a real estate crash took place in several Norwegian cities, the banking crisis was mainly confined to Oslo banks. Even so, credit conditions throughout the country, as well as business and consumer confidence, were affected.³⁰ The crisis was contained in 1899 and 1900 owing to continued growth abroad and liquidity support from NB, but the international business cycle downturn towards the end of 1900 contributed in the period 1901-05 to a more broad-based downturn and deflation in both 1902 (4.5%) and 1904 (4.8%). Wholesale prices declined in 1901, 1902 and 1903 (Graph 3.2.2). In particular, fixed investment was affected, reflecting earlier overinvestment in construction and real estate-related sectors (Graph 3.2.1). It fell by 8% in 1900 and fell on average until 1905. Growth in real private consumption fell sharply from 2.8% in 1899 to 0.6% in 1900 and remained low for the next couple of years. The international downturn and deflation gradually lessened the tight money market conditions, and discount rates in Norway and other countries could be reduced after 1900.

²⁷ About 95% of all homes were rented.

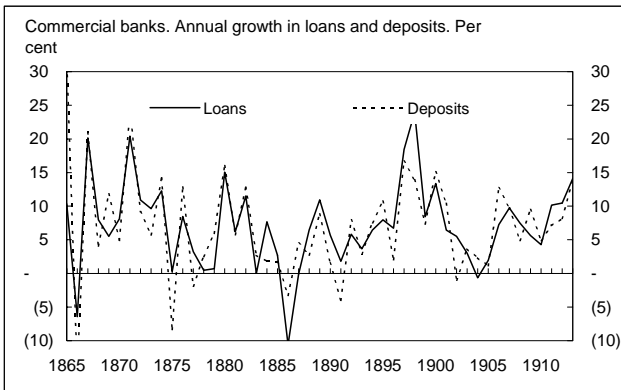
²⁸ Esty (1997) finds that organisational form matters for risk-taking. By studying US banking data in the period 1982-88, he notes that stock thrifts exhibited greater risk appetite than mutual thrifts. The reason is that the payoff to leveraged equity resembles a call option whose value can be increased by increasing the volatility of firm value, ie risk-shifting. Allen and Gale (1999) analyse the occurrence of bubbles and financial crises by focusing on the same agency problem associated with limited liability. By buying risky assets, the borrower can shift downside risk onto the lender, while retaining the right to any upside returns. The more risky the asset, the more attractive it becomes, and the size of the bubble is affected by the amount of credit available.

²⁹ The company was active in pulp and paper, machinery equipment and forestry. One of the two owners was a member of the Board of many important companies, eg in Christiania Bank og Kreditkasse. Chr. Christophersen had borrowed heavily from many banks, eg to expand into new business areas, but profitability turned out to be low. The company was also involved in fraud, as it had sold bills of exchange without cover.

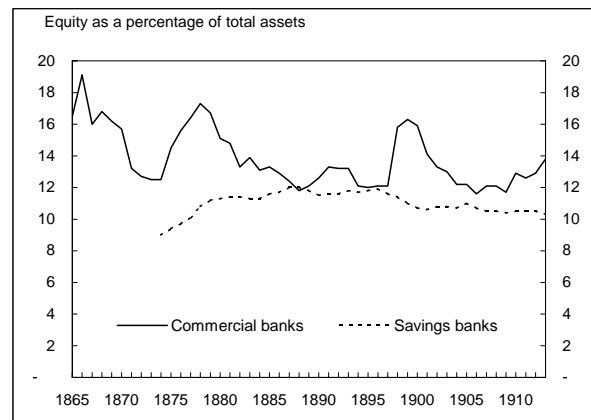
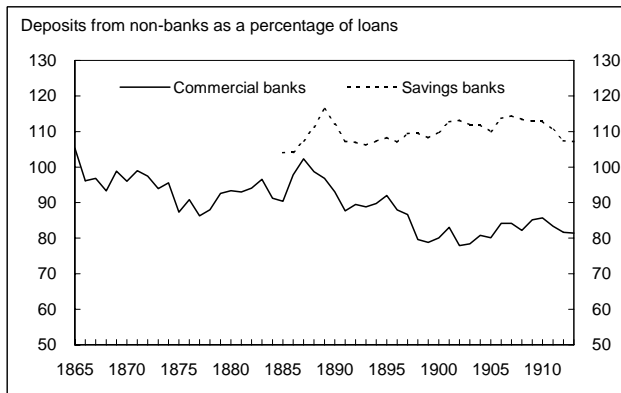
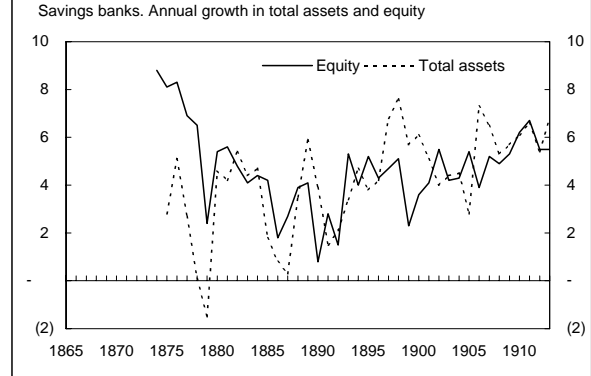
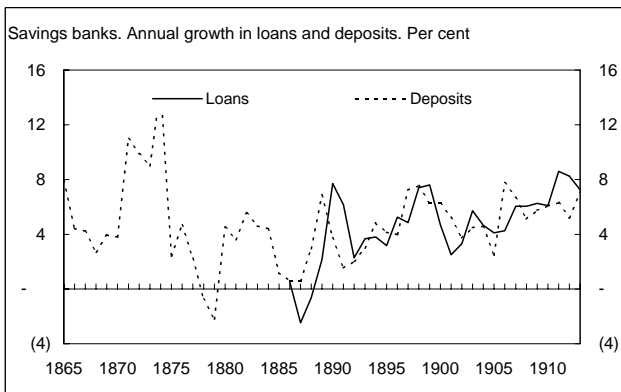
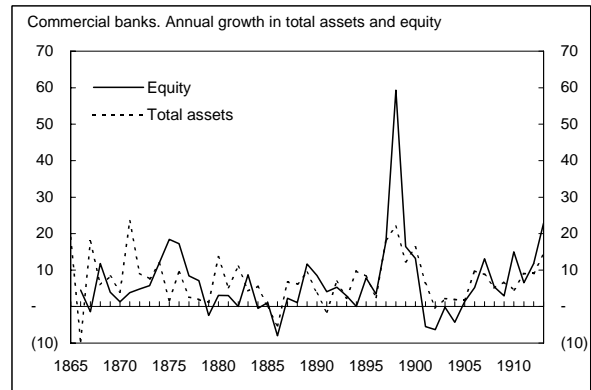
³⁰ See for example Klovland (1989).



Graph 3.2.7 Loans and deposits from non-banks
Year-end data. 1865-1913



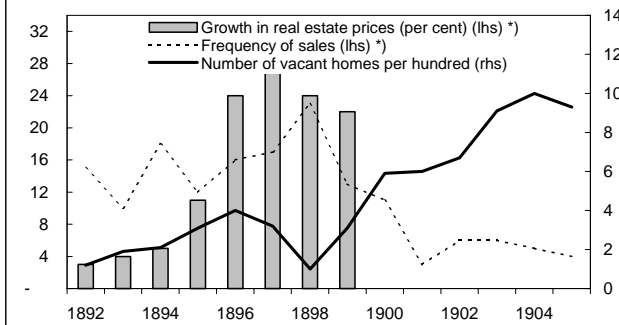
Graph 3.2.8 Equity and total assets
Year-end data. 1865-1913



Sources: Matre (1992); Statistics Norway; Norges Bank.

Sources: Matre (1992); Statistics Norway; Norges Bank.

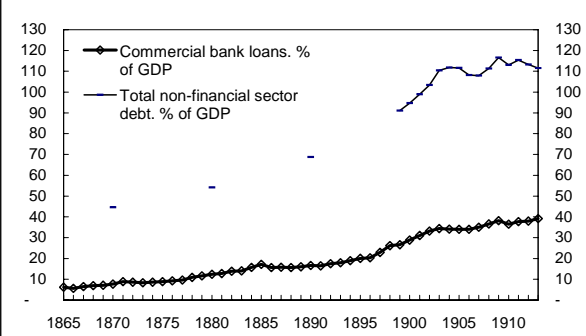
Graph 3.2.9 Asset prices. The real estate market in Oslo. 1892-1905



¹⁾ Based on a sample of 150 residential real estate buildings.

Sources: Hanisch and Ryggvik (1992); Statistisk årbok for Kristiania 1936 (Table 17).

Graph 3.2.10 Non-financial sector indebtedness. 1865-1913



Sources: Statistics Norway; Norges Bank.

Unwinding of financial fragility

While increased interest rates abroad and in Norway contributed to increased fragility before the crash, the causes of the crash were domestic. The number of bankruptcies rose in the period 1899-1905.³¹

- The crisis affected commercial banks that had expanded the most. All the newly established banks in Oslo failed, and many other banks incurred high losses. The high risk-taking at many commercial banks during the boom was thus not properly reflected in their capital positions, despite relatively high equity-to-total-assets ratios.
- The precipitous fall in asset prices reduced the net worth of non-financial firms and households. Liquidity in the stock market almost evaporated, and there was little activity on the stock market until WW1. The business cycle downturn encouraged emigration, notably to the United States. This resulted in a sharp increase in the vacancy rates of homes (in 1905 about one in every 10 homes was vacant), putting downward pressure on real estate prices (Graph 3.2.9). The number of new real estate companies was reduced from 59 in 1899 to 14 in 1900. The value of total sales of real estate fell from NOK 75 million in 1897 to NOK 4 million in 1901.
- Declining nominal GDP from 1900 to 1904 led to an increase in the non-financial sector's debt burden. Nominal bank borrowing continued to increase at a positive pace, and in particular the non-financial sector's bond debt rose, adding to the increase in indebtedness after the crisis. The increase in indebtedness probably reflected in part greater financial sophistication.

Resolution³²

There was no particular system in place to handle bank failures other than bankruptcy procedures or privately organised liquidations. However, NB appears to have been ready to provide liquidity support as long as the illiquid banks were deemed solvent. There were several instances of runs on banks, usually weak ones,³³ and subsequent provisions of liquidity support. In addition, NB was ready to take a leading position in restructuring or liquidating insolvent banks in an orderly way, thereby exposing itself to losses, if the banks in question were of significant importance to the stability of the financial system. In these cases, NB sought to avoid losses to depositors and other creditors. There appear to be several reasons for this: avoiding transmission of liquidity and solvency problems to other banks, runs on the banking sector as a whole, and external drain by foreign creditors. For example, two larger banks, *Discontobanken* and *Industribanken*,³⁴ both established during the boom, received considerable support from NB.³⁵ *Industribanken* also received support from the central government

³¹ The number of bankruptcies increased from around 400 per year prior to the crisis to around 700 per year in 1903-04 (http://www.ssb.no/emner/historisk_statistikk/aarbok/hf-1102-626.html).

³² This section is based on Rygg (1954), who was the Governor of Norges Bank from 1920 to 1946.

³³ Thus, the runs represented information-based runs as opposed to pure contagion, supporting the findings of Kaufman (1994), who writes that: "... there is no evidence to support the widely held belief that, even in the absence of deposit insurance, bank contagion is a holocaust that can bring down solvent banks, the financial system, and even the entire macroeconomy in a domino fashion."

³⁴ *Discontobanken* was the first bank to fail, eg because it had large exposures to Chr. Christophersen. NB provided liquidity support because it was deemed solvent, but the liquidity problems later escalated. NB took over a considerable part of the bank's portfolio of bills of exchange, but the bank's losses swelled towards the end of 1899 and in 1900, and it was later liquidated. Depositors and other creditors were paid back in full. *Industribanken* was established in 1897 to provide capital and credit to industrial companies, but the bank got heavily engaged in industrial and construction companies of a highly speculative character. It incurred high losses after the crash and lost the confidence of the stock market, but it was deemed solvent and reorganised. NB assumed that the strength of the bank had been regained after the reorganisation, and provided the bank with liquidity support in 1900 and 1901, when financing from foreign creditors was restrained. The Ministry of Finance placed deposits against collateral in the bank in 1901 and 1902 to keep it afloat. Despite these support measures, the bank was unable to issue new share capital. Its financial strength was examined and it was found insolvent by a group of commercial banks. NB proposed liquidating the bank, and was ready to incur losses to ensure that no creditors opted for a bankruptcy solution. Depositors and other creditors were provided with a guarantee that they would be paid back in full. The losses were shared with the Ministry of Finance, the local government in Oslo and Hypotekbanken. The liquidation took many years.

³⁵ In addition, NB provided liquidity support to a smaller bank, *Den nordiske Aktiebank*, which had been a leading speculator on the stock market. A reason for the liquidity support may have been that the bank failed only a few days after *Discontobanken's* failure, possibly leading to heightened uncertainty. NB sought later to liquidate the bank.

and the local government in Oslo. In contrast, a group of smaller commercial banks³⁶ were liquidated privately without any support from NB or the government.

NB reported losses in a number of years following the crash. Accumulated losses (not on a present value basis) in the period 1899-1908 resulting from the crash have been estimated at NOK 4 million (Rygg (1954), page 276), ie 0.3% of nominal GDP in 1908. In addition, an indirect cost of the liquidity support was that the amount of notes in circulation on many occasions exceeded the level set by law. I have no information on losses incurred by the government or the local government in Oslo, or those suffered by depositors and other creditors.

3.3 The banking crisis of 1920-28

Macroeconomic factors during WW1

After the outbreak of WW1, there was considerable uncertainty and turmoil in financial markets. There were hoarding of necessities, runs on many banks and increased demand for gold. Companies refused to extend trade credit, and financial links between Norwegian banks and foreign financial institutions were disrupted. NB supported businesses with foreign exchange and lent to banks and municipalities to support the purchase of necessities. NB's obligation to convert notes into gold was suspended in August 1914, and the interest rate at which NB was taxed when the amount of notes in circulation surpassed the legislative level was reduced. WW1 also marked the end of the Scandinavian currency union. This laid the ground for monetary expansion. The money supply and inflation picked up from the end of 1914 (Graph 3.3.2).

In 1915 it was clear that many sectors in the Norwegian economy would take advantage of trading with both warring parties. Economic growth was high in 1915 and 1916 (Graph 3.3.1), and growth in real private consumption rose to unprecedented levels. Growth in real fixed investment was high too. The balance of payments surplus became very large, reflecting eg high fish prices and historically high net incomes from shipping services. Norway transformed itself in a few years from a debtor nation with a net foreign debt of NOK 1,860 million in 1913 (100% of GDP) into a creditor nation with net foreign claims amounting to about NOK 1,400 million in May 1919 (23% of GDP). This was reflected in unprecedented gold inflows and a considerable monetary expansion. Private banks' foreign claims increased as a result of this development (Graph 3.3.4). The government fuelled this development by deciding that NB should provide loans to the British government for the purchase of fish, and later provide loans to Germany as well. Moreover, the Ministry of Finance permitted overdrafts of the government's and different special institutions' accounts at NB.

The unprecedented gold inflows led to inflationary pressures, and NB's *obligation* to convert gold into notes was suspended in 1916. Its *right* to convert gold remained, however, and NB continued to exercise it. Gold inflows did, however, abate for other reasons. Norway was hit economically by the war from the autumn of 1916. Restrictions on imports and exports were gradually introduced, and many ships travelling the North Sea were hit by torpedoes. Economic activity contracted markedly in both 1917 and 1918. Net income from shipping services remained high in nominal terms, but trade restrictions and rising import prices contributed to a lower balance of payments surplus. The growth in the money supply thus abated after the peak in 1916, but inflation continued to increase until it peaked in 1918 at 40%. There was just a slight increase in nominal interest rates compared with the pickup in inflation (Graph 3.3.3), possibly reflecting uncertainty about the durability of the extraordinarily high inflation levels. The Norwegian krone appreciated against many currencies despite comparatively high inflation because the normal adjustment mechanism inherent in the gold standard was replaced by restrictions on gold and goods trade.³⁷

³⁶ *Kristiania Delkrederebank* failed in 1901, *Norsk Vexel- og Landmandsbank* in 1902, and *Christiania Privatbank* and *Christiania Handelsbank* in 1904. All these banks, except *Christiania Handelsbank*, had been established during the preceding boom. *Christiania Handelsbank* was established as early as 1881, but had expanded rapidly during the 1890s.

³⁷ Edison and Klovland (1988) show that both the nominal and the real exchange rate of the Norwegian krone against the pound sterling appreciated sharply during WW1, leading to a loss of competitiveness.

Build-up of financial fragility during WW1

The banks and the stock market were immediately affected by the macroeconomic development during the war. In the first half of the war both high economic activity and monetary expansion supported expansion in the banking sector. In the second half of the war the financial and real economy went in different directions: the banking sector and the stock market continued to grow, while economic growth turned negative.

Competitive pressure

The number of commercial banks proliferated from 125 in 1914 to 200 in 1918 (Graph 3.3.5), a sharp deviation from the previous trend, contributing to increased competitive pressures. The number of savings banks also increased, but not faster than before. There were signs, however, that also savings banks expanded their business into new geographical or business areas, although their expansion may have been limited by regulation and on-site supervision.³⁸ The banking structure became even less concentrated than before (Nordvik (1992)). By contrast, commercial banks were only subject to the law governing limited liability companies, which did not entail any regulation of risk-taking or large exposures.

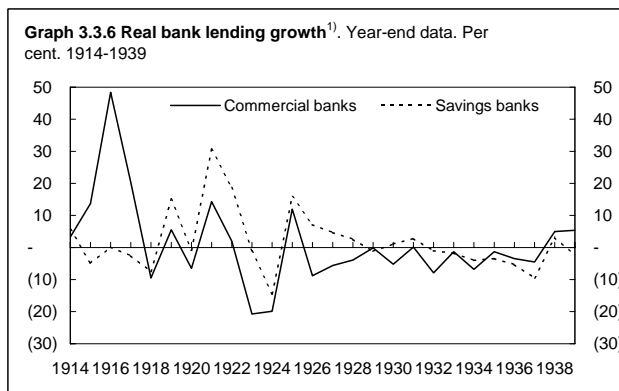
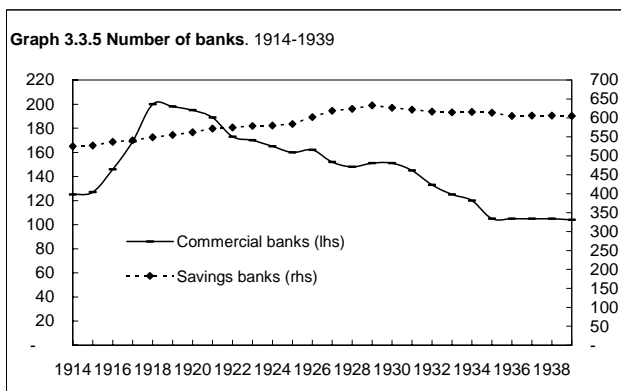
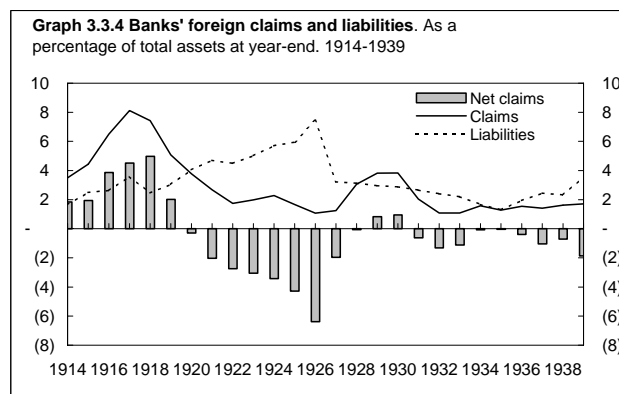
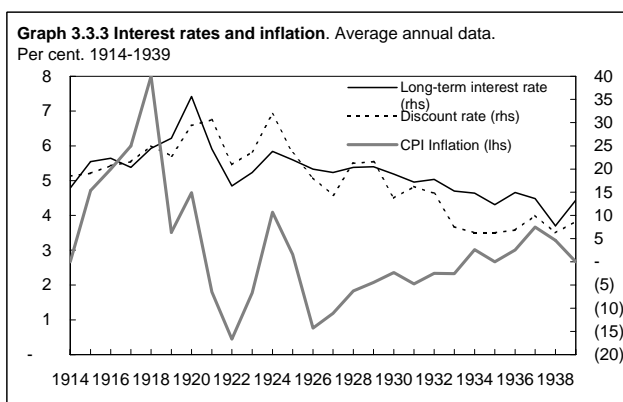
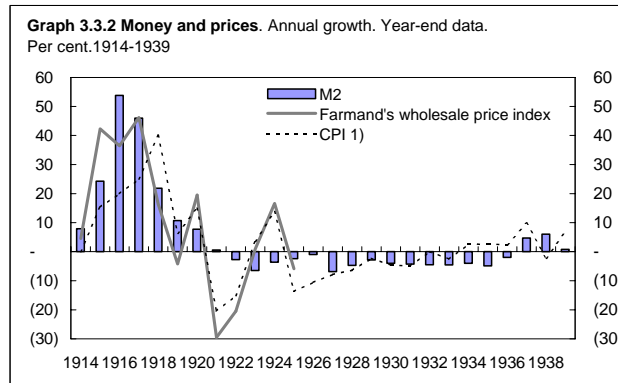
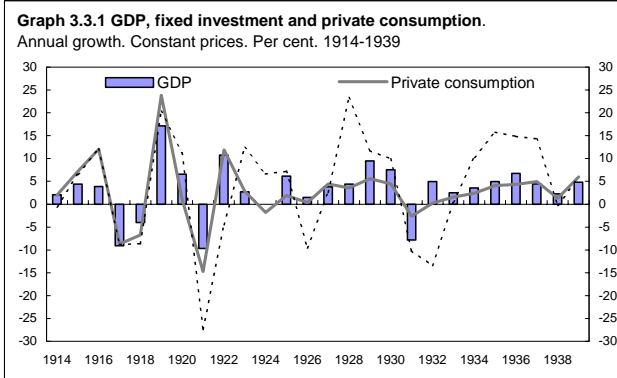
Banks' balance sheet

The commercial banks expanded their real lending significantly during WW1 (Graph 3.3.6), suggesting an aggressive lending stance. In addition to significant increases in deposits (Graph 3.3.7), which increased more than in savings banks, high earnings and new share capital issues boosted the commercial banks' lending possibilities (Graph 3.3.8). The buoyant stock market lessened the commercial banks' external financial constraints in the same way as during the latter half of the 1890s, by making it easy to issue new bank shares. Unprecedented interest rate margins on (risky) business loans, eg to shipping companies, boosted banks' earnings and part of these earnings was retained. These earnings may have been retained, at least in part, owing to a desire to build up cushions against future losses, but this is highly uncertain. Thus, the equity-to-total-assets ratio at commercial banks rose rapidly. By contrast, real lending growth at savings banks fell during WW1, suggesting a more careful lending stance. Their financial constraints were also different from those at commercial banks because they had no instruments other than deposits to sustain a rapid expansion of their balance sheets, and their loan portfolio consisted of a smaller, albeit increasing, share of business loans that earned a high interest rate margin. However, the rise in the deposits-to-loans ratio suggests that their funding possibilities did not pose a major constraint on lending expansion. The large increase in deposits, and hence total assets, contributed to a fall in their equity-to-total-assets ratio.

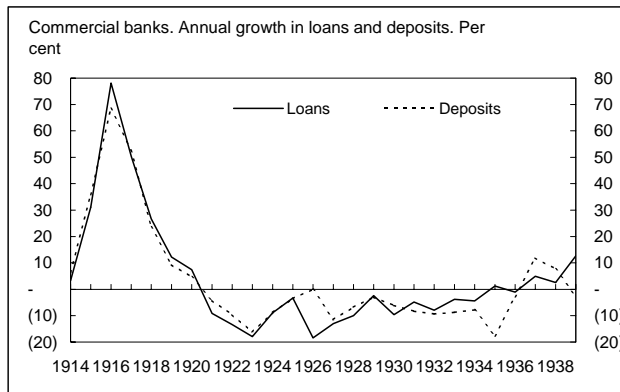
Asset price inflation

A speculative stock market bubble developed during WW1, in particular because shipping and whaling shares experienced a tremendous rise (Graph 3.3.9). Shipping companies paid out very high dividends. The number of new companies listed on the Oslo Stock Exchange rose from 215 in 1914 to 570 in 1918. The commercial banks contributed to this development, not by investing in shares, book or engaging in issuing activities, but rather by providing overdraft facilities to brokers, often without requiring collateral (Knutsen (1991)), or by providing loans for the purchase of shipping shares against shares as collateral (Ecklund and Knutsen (2000)). Overdraft facilities granted by commercial banks increased from 45% of their outstanding loans in 1913 to 74% in 1920. In contrast, mortgages provided by commercial banks changed very little even in nominal terms during this period. Savings banks also increased their overdraft facilities as a percentage of total outstanding loans significantly, but from a much lower level (5.4% in 1913). They were thus less exposed to adverse shocks arising from the stock market.

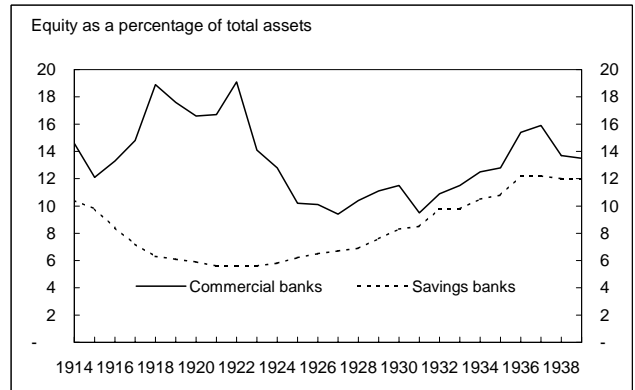
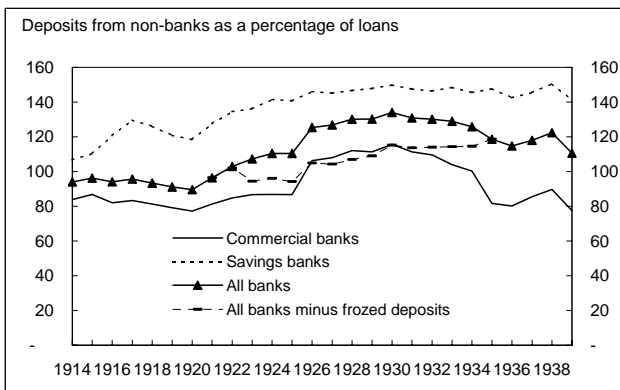
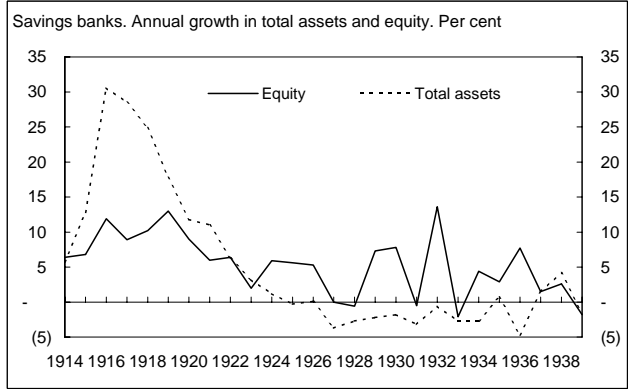
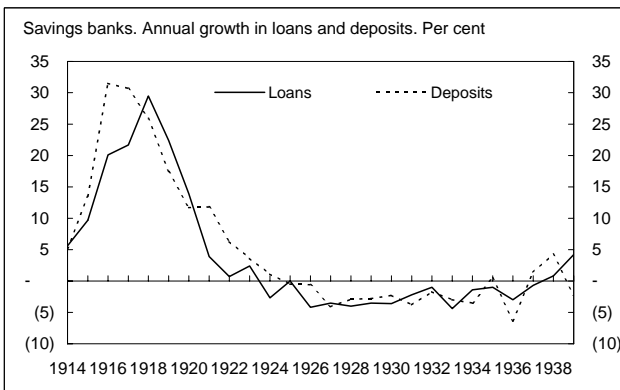
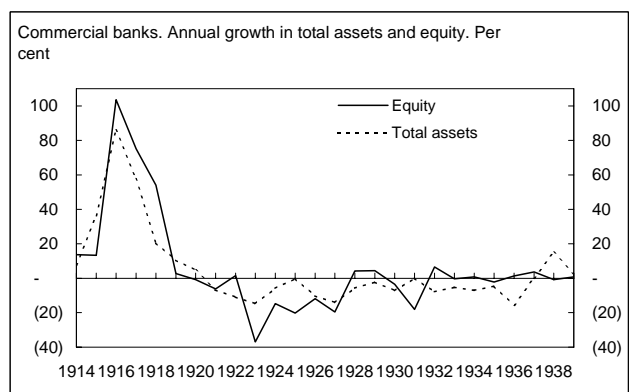
³⁸ Savings banks were required to behave prudently and to abide by accounting and disclosure standards. There were also requirements to the organisation and management of savings banks. Tendencies to imprudent risk-taking and other irregularities during WW1 made the financial supervisory authority increase its on-site supervision activities. The number of on-site supervisions increased from on average 50-60 per year prior to WW1 to 264 in 1916-17 (Ecklund and Knutsen (2000)).



Graph 3.3.7 Loans and deposits from non-banks
Year-end data. 1914-1939



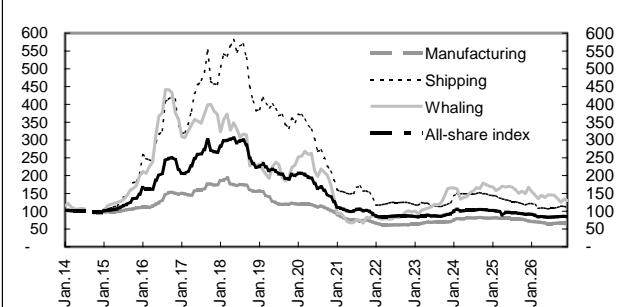
Graph 3.3.8 Equity and total assets
Year-end data. 1914-1939



Sources: Klovland (1984); Statistics Norway; Norges Bank.

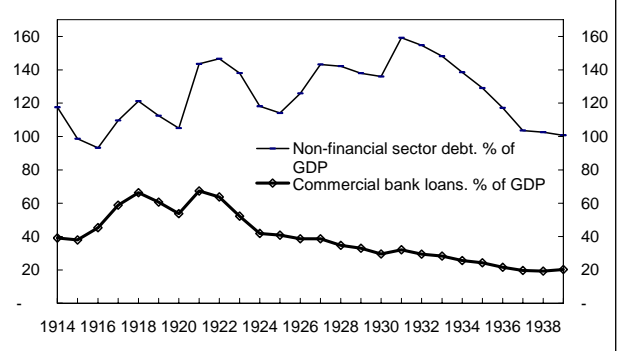
Sources: Statistics Norway; Norges Bank.

Graph 3.3.9 Asset prices. Oslo Stock Exchange all-share index and various sub-indices. Monthly figures. Indexed, 1913=100. 1914-1926



Source: Keilhau (1927).

Graph 3.3.10 Non-financial sector indebtedness. 1914-1939



Sources: Statistics Norway; Norges Bank.

Indebtedness

The non-financial sector increased its debt only slightly as a percentage of nominal GDP during WW1 (Graph 3.3.10). Indebtedness even fell in 1915 and 1916 because of strong economic growth and inflation. As in the previous episode, however, commercial banks' credit rose rapidly. Total outstanding commercial bank loans measured as a percentage of nominal GDP rose by 28 percentage points from 1913 to 1918.

Special factors – high risk associated with lending during the war

Abundant liquidity during WW1 contributed to the highly speculative bubble in the stock market. There was a dearth of long-term projects and banks had poorly developed links with some financial markets abroad, in particular the US market, making it difficult to invest their funds abroad. As mentioned earlier, private banks increased their net foreign claims, but not enough to contain the credit boom. In addition, great uncertainty about the outcome of the war made foreign investments especially risky. Long-term planning became increasingly difficult, as ships became targets of German submarines and restrictions on foreign trade, including imports of capital goods, were tightened.

The aftermath of the war and the crisis of 1920-28

Macroeconomic factors

Norway experienced a brief business cycle upturn after the war (Graph 3.3.1), but considerable macroeconomic and financial imbalances gradually surfaced. The lifting of trade restrictions exposed Norwegian industries to foreign competition. Imports rose by 121% in 1919, reflecting demand for both necessities and luxury goods. This resulted in a very large deficit on the trade balance. NB's obligation to sell gold against notes was suspended in 1920 to deter a massive outflow of gold.³⁹ The Norwegian krone depreciated in 1919 and 1920 against many currencies, and Norway was transformed into a debtor nation at year-end in 1920. This was reflected in a reversal of private banks' net foreign claims (Graph 3.3.4).

The international business cycle downturn and the deflationary spiral that was created in the second half of 1920 posed a considerable adverse shock to the highly fragile Norwegian banking sector. Real GDP fell by nearly 10% in 1921. This development was compounded by the change in monetary policy stance in late 1920, aimed at restoring the gold standard at the prewar parity.⁴⁰ Continued inflation in 1920 (Graph 3.3.2) in Norway made this more difficult.

The period 1920-28 became a period of macroeconomic instability, unrest in labour markets, monetary contraction and deflation. The banking crisis unfolded after 1920. Confidence in the Norwegian krone fell as a result, and the currency depreciated precipitously against Norway's trading partners and its prewar gold parity from 1920 to the mid-1920s.⁴¹ NB's discount rate was thus kept high compared with many other countries, but liquidity support to banks in crisis and other rescue operations restrained the central bank's efforts to return to the gold standard. As a result, deflation was not as severe as in many other countries in the first half of the 1920s, and there was even inflation in 1924 and 1925. However, the discount rate was raised significantly from 5% to 7% in the course of 1923, and was kept high in 1924. In 1925 there was an improvement in the current account and a contemporaneous appreciation of the Norwegian krone, and this development was reinforced by market expectations of continued appreciation. This resulted in a new wave of deflation and increased unemployment, the so-called "gold-parity depression" of 1925-27.⁴² Private banks increased their net foreign claims. The Norwegian economy accelerated after 1927 in line with the international business cycle upturn. The gold standard was restored in 1928. At the same time, the banking crisis was effectively over.

³⁹ NB's obligation to convert notes into gold had been reinstated in 1916, but at that time this had no importance, as the problem was to avoid too large gold inflows rather than outflows.

⁴⁰ It is the general view that this was the new Governor Nicolay Rygg's intention.

⁴¹ The international exchange value of the Norwegian krone was 50% of its prewar parity in 1924 (Klovland (1998)).

⁴² See Klovland (1998), who describes the developments in Denmark and Norway, on the one hand, and Sweden, on the other. Denmark restored the prewar parity gold standard in 1927 and Norway in 1928, after a period of deflationary policy. Sweden had no need to deflate the economy because it had already restored the prewar parity in 1924.

Unwinding of financial fragility

The degree of financial fragility built up during WW1 and the brief business cycle upturn was very serious, leading to a deep banking crisis as it was unwound. The number of bankruptcies rose to historically high levels:⁴³

- Both commercial and savings banks were affected by the crisis, but commercial banks experienced far more severe liquidity and solvency problems. Their capital vanished rapidly in the early 1920s, as the high risks built up during the boom years materialised (Graph 3.3.8). By contrast, savings banks increased their equity-to-total-assets ratio during the 1920s, because losses were smaller and retained earnings continued to boost equity. Losses at savings banks were mostly concentrated in the latter half of the 1920s, once the “gold-parity depression” led to falling asset prices and increases in the debt burden.⁴⁴ Difficulties in the farming sector added to the losses. High real bank lending in some years gives a misleading picture of bank performance, because it reflects severe deflation rather than high lending growth.
- The return to more normal economic conditions in late 1918 contributed by itself to a fall in asset prices, but the business cycle downturn of 1920-21 precipitated a further fall (Graph 3.3.9).
- The brief business cycle upturn and the high nominal GDP growth after WW1 reduced the non-financial sector debt burden (Graph 3.3.10), but the precipitous fall in nominal GDP from 1920 to 1922 led to more than a reversal of this development. Positive nominal GDP growth from 1923 to 1925 contributed to reducing the non-financial sector debt burden, but the “gold-parity depression” led to a new peak in its debt burden. The level of indebtedness fell as economic activity picked up in 1927. The bond market lessened the consequences of the contraction in bank lending during the 1920s. Non-financial companies and municipalities increased their bond debt in nominal terms as they replaced short-term loans incurred during WW1. Nominal expansion in state-owned banks worked in the same direction. Hence, commercial banks reduced their market share of credit to the non-financial sector from 55% in 1918 to 25% in 1928. The contraction in economic activity and deflation in 1931 contributed to a rise to a historical peak in indebtedness (only matched by the development in the late 1980s), but the amount of bad debt was at this point much lower than in the early 1920s. Hence, the adverse consequences of this hike were less pronounced for the banking sector. Indebtedness fell sharply in the remainder of the 1930s as economic activity rebounded.

Resolution⁴⁵

NB's actions during the crisis of 1920-28 seem to have been guided by the same principles as in the former crisis.⁴⁶ NB was ready to provide liquidity support to banks that were deemed solvent,⁴⁷ and was ready to expose itself to losses as part of an orderly reconstruction or liquidation of insolvent banks if they were considered to be of importance to the stability of the financial system.

In 1920 and 1921, most cases were handled by NB in cooperation with private banks. By trying to reconstruct problem banks and limit losses to depositors and other creditors, they wanted to prevent bankruptcy. Healthy private banks could in this way reduce the risk of losses on their direct exposures

⁴³ The number of bankruptcies increased from less than 500 during WW1 to over 1,000 per year at the beginning of the 1920s, and to around 1,400 per year in the mid-1920s (http://www.ssb.no/emner/historisk_statistikk/aarbok/hf-1102-626.html).

⁴⁴ Part of these losses may actually pertain to the build-up of risk during WW1, and should have been recorded in the early 1920s (Ecklund and Knutsen (2000)).

⁴⁵ This section is based on Rygg (1950) and Ecklund and Knutsen (2000).

⁴⁶ NB was also concerned with regional aspects. The first bank that failed, *Finnmarkens Handelsbank*, was located in the north of Norway. NB deemed it necessary to organise an orderly liquidation of the bank, both because of its special role in that region, and to secure the confidence in the banking sector as a whole. NB guaranteed in cooperation with some other banks that depositors would be paid back in full.

⁴⁷ In order to limit losses pertaining to insolvencies, discounted paper had to be of good quality and stored in its vaults. Bills of exchange that were brought for discounting at NB were initially required to be of short maturity. This requirement was, however, relaxed in the course of the crisis.

to the failing banks and the risk of widespread bank runs.⁴⁸ There was as yet no supervisory authority for commercial banks, so each bank's solvency and future prospects had to be analysed without any prior in-depth knowledge of the problem banks' financial health and exposures.

The severity of the banking crisis required more active involvement by the government. The Ministry of Finance took part in the resolution of failing banks from the spring of 1921. A fund was set up in 1921 to place deposits at problem banks.

In 1922, a crisis erupted in Norway's two largest banks, *Centralbanken for Norge* and *Foreningsbanken*. Their share prices tumbled and many deposits were withdrawn. NB contained the liquidity problems at the former bank, but the losses later escalated. Both banks were provided with loan capital from NB, the government, private banks and individuals as part of a reconstruction plan. The difficulties at the two banks continued in 1923 and 1924, and problems surfaced in a third large bank as well. The risk of widespread bank runs became imminent in the course of 1923. Foreign creditors became worried about the financial strength of Norwegian banks. The systemic nature of the crisis made it clear that private banks were not in a position to contribute to an orderly reconstruction or liquidation of other weak or failing banks. NB's involvement in weak banks was already considerable.

As a result, separate rules for the public administration (receivership) of failing banks were introduced in 1923.⁴⁹ The two largest banks applied for public administration along with many other banks in 1923. The government provided a guarantee to NB for liquidity support to *Den norske Handelsbank*, Norway's fifth largest bank, but losses later mounted and the bank was placed under public administration. Commercial banks under public administration represented 25% of total commercial bank assets in 1926.

Table 3.1
Bank losses and provisions
As a percentage of total assets

Year	Commercial banks	Savings banks
1913	0.16	0.11
1920	0.96	0.27
1921	2.25	0.40
1922	2.16	0.59
1923	8.00	0.59
1924	3.14	0.49
1925	8.61	0.69
1926	5.67	0.71
1927	5.82	0.87

Source: St. meld. Nr. 29 (1929).

⁴⁸ The risk of direct losses and a drying-up of capital markets, rather than bank runs, were important for the private sector resolution of the LTCM crisis in 1998 (Greenspan (1998)).

⁴⁹ Banks under public administration continued to some extent with normal operations, eg new deposits could be placed at the banks. However, the banks' obligations were frozen and the administration board decided which creditors should be repaid and to what extent. Further, new deposits had priority over old ones. This system was considered more flexible and more appropriate than ordinary bankruptcy rules because it would enable a thorough assessment of the bank's portfolio, limit losses to creditors and reduce the risk of contagion. Foreign creditors were not satisfied with the system of public administration, because it eliminated their option of withdrawing credit. The government consequently decided that it would guarantee all obligations incurred by *Centralbanken for Norge* and *Foreningsbanken* under public administration, and decided also that almost all old credit to foreign creditors would be paid back in full.

Separate legislation for commercial banks was introduced in 1924, implying regulation of eg the establishment, organisation and management of such banks, and providing limits on large exposures. A new law for savings banks was also passed. A supervisory authority encompassing commercial banks was established. The supervisory authority became a central part of the resolution process. A guarantee fund for savings banks with voluntary membership had been in place since 1921, probably containing some of the problems in this sector. Membership became obligatory in 1924. A guarantee fund for commercial banks was first introduced in 1938. Both guarantee funds had wide mandates to support member banks in liquidity or solvency crisis, ie they were not pure deposit insurance schemes.

In total 131 banks either went bankrupt (generally small banks), were liquidated, merged with other banks or reconstructed. Recorded losses rose to unprecedented levels (Table 3.1). Commercial bank losses alone amounted to 8% in 1913 and 9% in 1925 as a percentage of total assets, or about 8% of nominal GDP in these two years. Accumulated bank losses in the period 1921-29 amounted to 30% of average nominal GDP in this period (Skånland (1990)). Most banks that were placed under public administration in the period 1923-28, including 47 commercial banks and 20 savings banks, were liquidated in the period 1928-35. The banking structure became more concentrated as a result. Liquidation of the largest banks was especially protracted. A few banks resumed operations as normal.

NBs recorded much higher losses than in the former banking crisis. Accumulated provisions (not on a present value basis) in the period 1921-29 amounted to NOK 106.5 million, ie 2.5% of nominal GDP in 1929. I do not have information on the losses of the government or municipalities. Losses for depositors and other creditors were contained by rescue operations and liquidity support, but indirect losses were incurred because assets at failing banks could be frozen for many years.

3.4 The banking crisis of 1988-92

Macroeconomic factors – from a stable to an unstable macroeconomic environment

The run-up to the banking crisis of 1988-92 had its roots in the structural imbalances that developed in the 1970 and 1980s, which represented a transitional phase from the heavily regulated financial system after WW2 to the market-based system in the mid-1980s.

Macroeconomic developments from the 1950s to the beginning of the 1970s were relatively stable. Real interest rates were generally near zero and often negative, because the government had a preference for a low and stable nominal interest rate. Regulation of credit and interest rates limited private banks' abilities and incentives to expand and take on high risk. Fiscal and credit policy were actively used to stabilise the economy. High inflation during the 1970s and favourable tax treatment of interest expenses made the effective real interest rate on household debt greatly negative (Graph 3.4.3). The demand for credit increased, leading to expansion in the more unregulated parts of the financial system ("grey market") and increased borrowing from abroad. The system of direct regulation of the financial system thus became less and less viable.

Growth in the Norwegian economy accelerated from 1983 (Graph 3.4.1). Deregulation of the financial sector facilitated strong growth in domestic spending. The first important change in regulation was already in place: prior to 1979 banks were largely obliged to hold zero net positions in the spot currency market, but that rule was relaxed by including forward contracts in the netting calculation. This new rule implied that banks could finance part of their domestic lending in Norwegian kroner through capital flows from abroad. Private banks' net foreign claims were drastically reduced as banks utilised the change in regulation to fund their high lending growth (Graph 3.4.4). A fixed exchange rate within narrower bands (from 1984) reinforced the risk-free speculation against the Norwegian krone, underpinning capital inflows and rapid credit expansion (Grønvik (1986)).⁵⁰ Quantitative regulation of banks' lending was lifted in 1984. Regulation of interest rates was removed the following year. The secondary market for housing was deregulated in the beginning of the 1980s. The stock market

⁵⁰ A devaluation was usually not expected prior to an election, which was due in 1985. There was therefore confidence in the krone from 1984 to 1985.

increased in importance during the 1980s, but banks remained a more important source of finance. The stock market did not regain its pre-WW2 role. The value of houses and commercial real estate became an important part of the boom and bust cycle in the Norwegian economy. Contrary to the situation before WW2, most households now owned their own home.

Real private consumption rose by 10% in 1985 (Graph 3.4.1). Fixed investment in mainland Norway grew strongly in the mid-1980s. In addition, real exports rose by more than 7% annually from 1983 to 1986. Fixed investment in the oil sector was more volatile (26% in 1982, 65% in 1983 and 11% in 1984).⁵¹ Fiscal policy changed from neutral to expansionary in 1984.

Build-up of financial fragility in the mid-1980s

The banking sector reacted strongly to the macroeconomic development and financial deregulation, leading to a reinforcement of the boom and a considerable build-up of financial fragility.

Competitive pressure

The number of banks increased slightly in the mid-1980s (Graph 3.4.5), reversing the steady decline after WW2. There was, however, a rapid expansion in the number of branches at existing commercial banks⁵² following liberalisation of the authorisation to establish branches. Competition from foreign-owned banks, credit companies, insurance companies and in particular finance companies led to intensified pressures. Bank managers were not used to operating in a competitive environment and increased their focus on gaining market share. Many banks expanded into geographical and business areas in which they had little prior knowledge, as many had during WW1. Contrary to WW1, however, commercial banks expanded into new areas through an increased number of branches because deregulation made this possible.

Banks' balance sheet

Real lending growth at both commercial and savings banks increased rapidly after 1982 (Graph 3.4.6). Growth in outstanding bank loans outpaced growth in deposits at commercial banks (Graph 3.4.7), just as in previous periods of strong expansion, but this time an inflow of foreign capital supported and reinforced their high lending growth. The same development occurred at the savings banks, in contrast to the two earlier episodes, suggesting a more aggressive lending policy stance. Equity, on the other hand, fell as a percentage of total assets as a result (Graph 3.4.8). At the savings banks, this downward trend began in 1982,⁵³ while at the commercial banks it was already in place from 1972 following reduced capital requirements, reaching an all-time low in 1987. In the same year capital regulation was loosened, possibly contributing to moral hazard problems by making it possible for banks to increase their leverage.⁵⁴

Asset price inflation

House prices increased by around 50% in real terms from the beginning of the 1980s to their peak in 1988 (Graph 3.4.9). Rising house prices supported higher borrowing levels by households through their effect of collateral and fuelled consumption spending. Commercial real estate prices also rose rapidly.

⁵¹ Oil companies were not important borrowers for Norwegian banks, as they normally used international capital markets for their financing. The oil sector had, however, a substantial impact on the performance of the oil-dependent Norwegian economy, both directly through fixed investment and through the government's fiscal policy.

⁵² The number of commercial banks (savings banks) including branches rose from 589 (1,298) in 1981 to 740 (1,426) in 1988 (NOU 1992: 30 Bankkrise, p 65).

⁵³ Savings banks increased on average their equity-to-total-assets ratio markedly from 1976 (to 1982) following introduction of tax exemption on a part of savings banks' equity.

⁵⁴ See Section 4.3 for an explanation.

Indebtedness

Non-financial sector indebtedness increased rapidly from 1981 to 1987 (Graph 3.4.10), when it reached the same level as in 1931. Both savings banks and commercial banks contributed to this, as they increased their market share at the expense of other sources of credit to the non-financial sector.

Special factors – deregulation and weak supervisory authority

Deregulation of the financial sector represented an abrupt shift in the competitive environment for the banks. Likewise, banking supervision activities, including on-site inspections, were reduced. This development was due to low resources and signals from the Ministry of Finance to concentrate more on supervising market trading activities.⁵⁵

The crisis

Macroeconomic factors from 1986

The sharp oil price decline and high wage demands in early 1986 posed a great challenge for the Norwegian economy. Financial markets speculated heavily against the Norwegian krone. The fixed exchange rate regime had lost credibility due to several devaluations in the period 1977 to 1984. NB defended the Norwegian krone, but sterilised the sales of foreign exchange due to the government's preference for a stable nominal interest rate. Sterilisation was carried out by increasing central bank lending to banks from zero to a level between 10 and 15% of banks' funding, contributing to the rapid growth in bank lending.

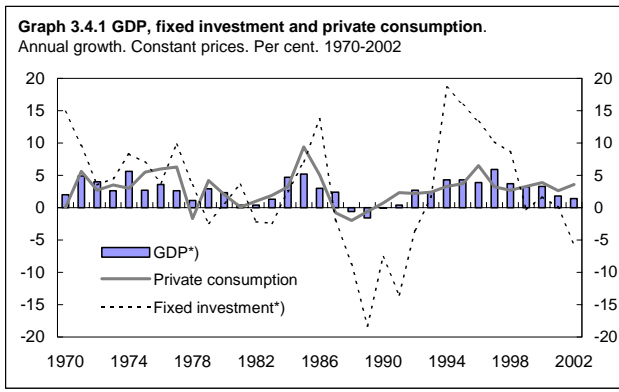
The Norwegian krone was finally devalued in May 1986 by almost 10%. Towards the end of 1986 it became clear that the interest rate should be set with the objective of securing confidence in the fixed exchange rate regime, and not be politically determined. This was combined with a contraction in fiscal policy. Inflation was soon brought down, and confidence in the exchange rate was largely restored by 1989. However, the high interest rates in Germany from 1989 had repercussions for Norway, because NB had to follow up with an interest rate increase (Graph 3.4.3), despite a considerable slowdown in the economy. A tax reform in 1992 increased the real value of household debt further by reducing the top marginal tax rate applied to interest deductions. Real private consumption fell from 1987 to 1989 (Graph 3.4.1), and private fixed investment in mainland Norway fell sharply each year from 1987 to 1993, reflecting in part overinvestment in many sectors during the preceding boom.

Unwinding of financial fragility

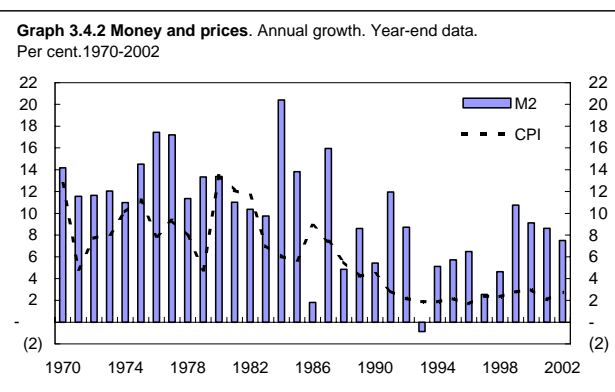
The banking crisis coincided with the worst recession since the interwar period, reflecting the unsustainable boom in the mid-1980s. Bank losses mounted (Table 3.2) in line with the number of bankruptcies.⁵⁶

⁵⁵ The Banking Inspectorate was merged with the bodies supervising insurance companies and securities traders into the Banking, Insurance and Securities Commission (Kredittilsynet). In this process the banking supervision part lost qualified personnel, and the Ministry of Finance did not provide Kredittilsynet with sufficient resources to hire new qualified personnel. In the spring of 1986, Kredittilsynet had only two or three inexperienced persons assigned to on-site supervision. (Source: Report from the Parliament's commission on the banking crisis: Dokument nr. 17. (1997-98): "Rapport til Stortinget fra kommisjonen som ble nedsatt av Stortinget for å gjennomgå ulike årsaksforhold knyttet til bankkrisen.") In addition, Kredittilsynet was just as inexperienced at operating in a deregulated environment as the banks themselves.

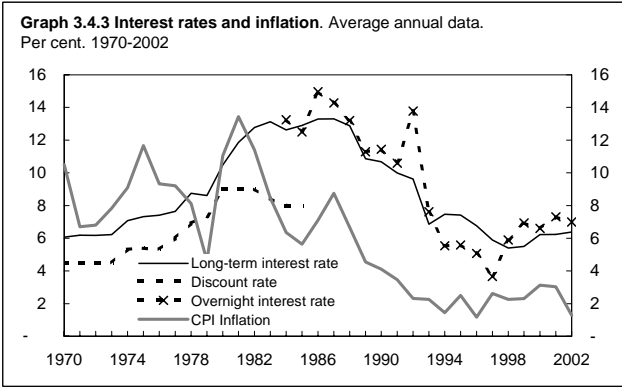
⁵⁶ The number of bankruptcies increased by almost 600% to 1992 from around 1,000 in 1982 (http://www.ssb.no/emner/historisk_statistikk/aarbok/hf-1102-626.html).



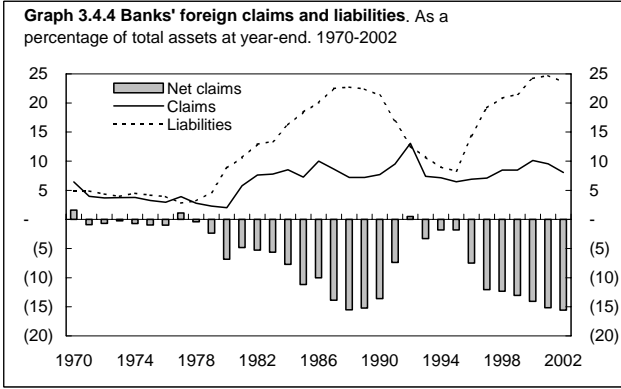
*) Private sector, mainland Norway from 1971.
 Sources: Statistics Norway; Norges Bank.



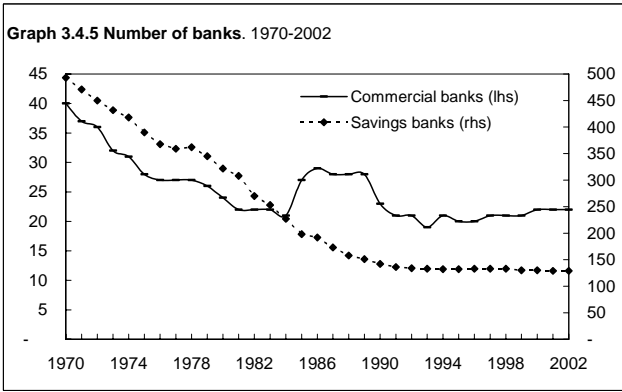
Sources: Statistics Norway; Norges Bank.



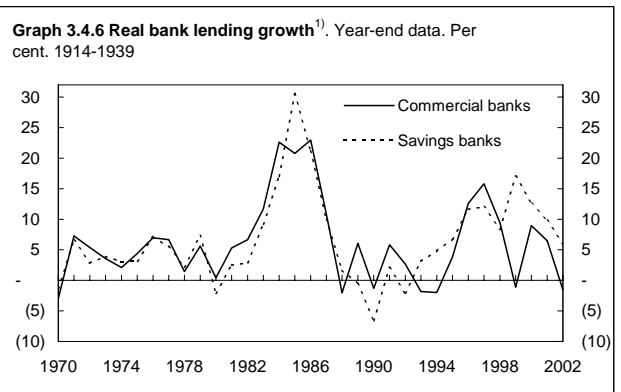
Sources: Statistics Norway; Norges Bank.



Sources: Statistics Norway; Norges Bank.

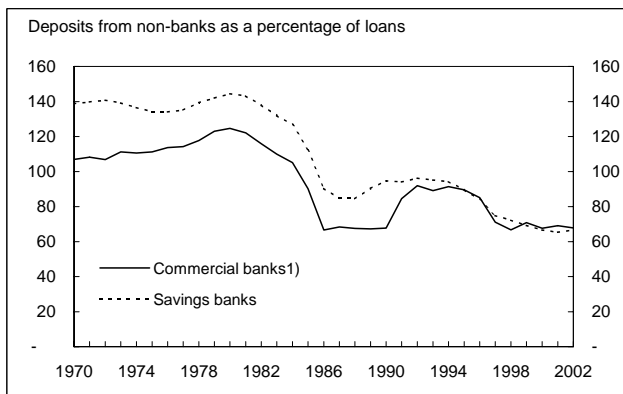
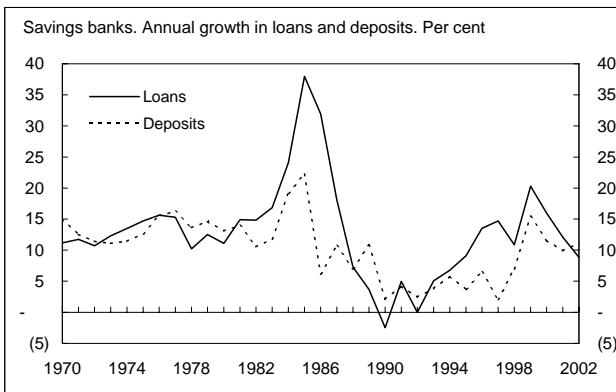
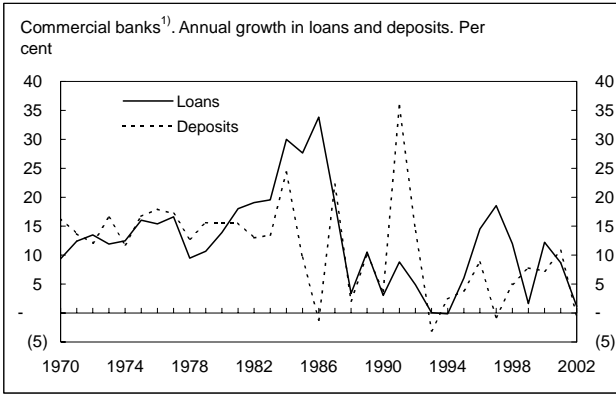


Sources: Statistics Norway; Norges Bank.



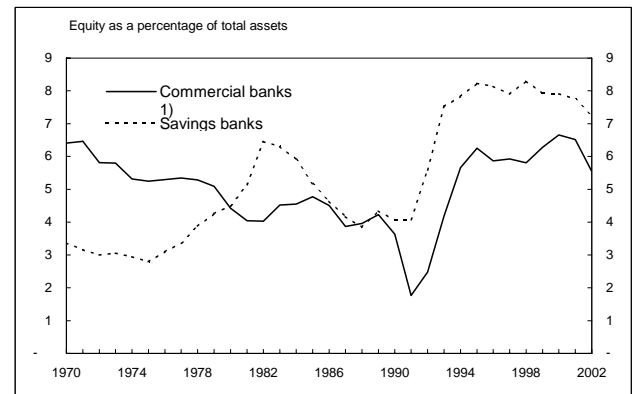
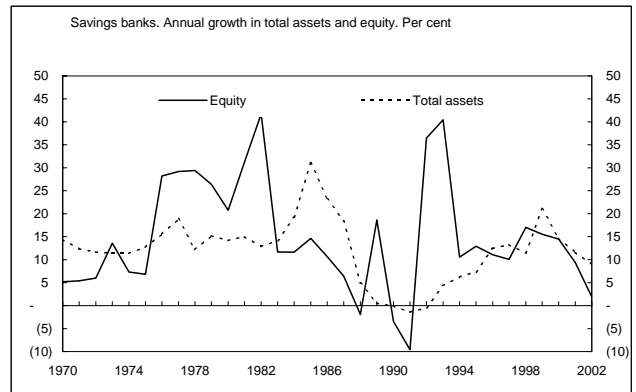
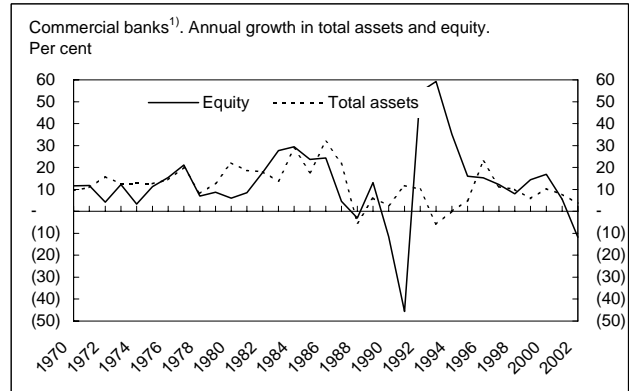
¹⁾ Deflated by CPI.
 Sources: Statistics Norway; Norges Bank.

Graph 3.4.7 Loans and deposits from non-banks
Year-end data. 1970-2002



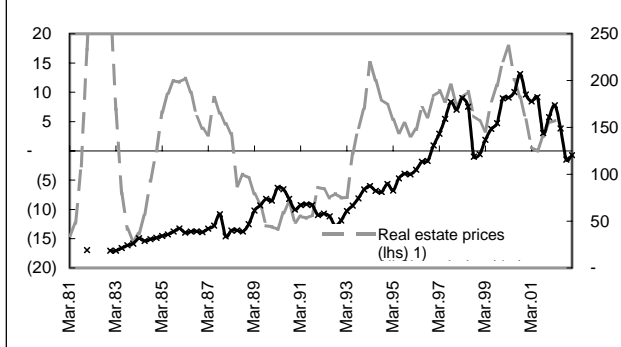
¹⁾ Including Postbanken from 1991.
Sources: Statistics Norway; Norges Bank.

Graph 3.4.8 Equity and total assets
Year-end data. 1970-2002



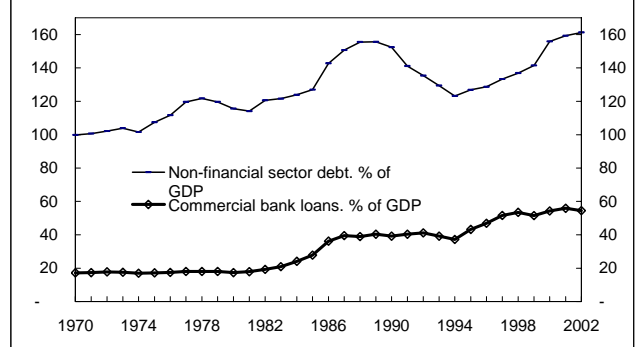
¹⁾ Including Postbanken from 1991.
Sources: Statistics Norway; Norges Bank.

Graph 3.4.9 Asset prices. Quarterly data. 1981-2002



¹⁾ 12-month growth in residential real estate prices deflated by CPI. Per cent.
²⁾ Oslo Stock Exchange All share-index. Index, 3. January 1983=100.
Sources: Statistics Norway; NEF/ECON; Norges Bank.

Graph 3.4.10 Non-financial sector indebtedness. 1970-2002



Sources: Statistics Norway; Norges Bank.

- Growth in outstanding loans and deposits at both commercial banks and savings banks slowed markedly in nominal and real terms from 1986 to the mid-1990s (Graphs 3.4.6 and 3.4.7), and outstanding loans fell far more than deposits as banks repaid their foreign loans (Graph 3.4.4). Large bank losses wiped out the capital of the largest banks, but the provision of new capital by the government contained the crisis (Graph 3.4.8). The bank losses were broad-based. Losses on loans to households, however, constituted a small part of total losses (around 15%), despite the sharp fall in the value of collateral. Commercial banks suffered the most in the crisis because they had a more risky portfolio consisting of a higher share of risky business loans as opposed to household loans. There are indications of higher losses in the new branches.⁵⁷
- House prices fell by about 1/3 in real terms from 1988 to 1992 (Graph 3.4.9), contributing to lower household spending and reduced economic activity. Decline in commercial real estate prices caused banks' losses to increase. The stock market followed developments in international stock markets more closely and was not affected by the domestic slowdown.
- Non-financial sectors reduced their indebtedness in the course of the crisis as they corrected their balance sheet by increasing savings and reducing their debt (Graph 3.4.10). There was also a shift in the source of borrowing from state-owned banks to private banks, reflecting a political decision to reduce their role. Indebtedness fell further when economic activity rebounded in 1993.

Resolution⁵⁸

During the first part of the banking crisis (1988-90), resolutions of problem banks were mostly financed by the banking industry's own guarantee funds. The guarantee funds had been established in the interwar period, were financed by the banks themselves and had as mentioned earlier wide mandates to support banks in crisis. The guarantee fund of savings banks was obliged by law to provide an unlimited guarantee to depositors, while the guarantee fund of commercial banks *could* do this. Both guarantee funds had a board of directors with a minority of one representative from NB and Kredittilsynet, respectively. NB provided liquidity support on many occasions on an individual basis. Only one small and newly established commercial bank was liquidated. The other 17 local and regional banks that failed or were weakened in the first phase of the crisis were merged with larger banks.

By late 1990 the banks' guarantee funds were effectively depleted and serious problems with loan losses appeared at the larger banks, which were unable to attract external equity capital in the market to prop up their weak capital position. Thus, the government established a Government Bank Insurance Fund (GBIF), with a mandate to lend capital to the two bank guarantee funds.

In mid-1991, the GBIF gave its first support loans to the commercial banks' guarantee fund to enable it to supply capital to the second and fourth largest banks (*Kreditkassen* and *Fokus*), which had reported large losses. The loans were given subject to some conditions, eg the original share capital should be written down reflecting the losses and the board of directors replaced. Similar arrangements were also made with the savings banks' guarantee fund to supply capital to two regional savings banks having lost all their equity.

The crisis escalated later in 1991 when *Kreditkassen* became insolvent and *Fokus* lost its share capital while a large part of the equity in the largest bank (*Den norske Bank*) was lost. The government thus doubled the capital of the GBIF. In addition, a separate Government Bank Investment Fund was established to invest capital in the banks on commercial terms. An arrangement with loans from NB to all banks at below market interest rates was introduced. GBIF infused new equity capital directly into *Kreditkassen* and *Fokus*, after attempts to find private investors willing to invest in the banks had proved unsuccessful. Old equity was written down to zero, and new capital was provided by the GBIF, leading to a nationalisation. This represented a new way of dealing with banks in crisis in Norway.

In December 1991 new equity capital was also supplied from GBIF to *Den norske Bank*, which by year-end was estimated to have a capital ratio of only 2%. The old shares were written down by 90%.

⁵⁷ See NOU 1992: 30 Bankkrisen, p 28.

⁵⁸ This section draws heavily on Vale (2003). For a review comparing the resolution of the crises in the Nordic countries, see BIS (1993).

As the three large banks continued to record loan losses through 1992, it became evident that they would not meet the 1988 Basel capital standards by the end of 1992 as required under Norwegian law. Thus, the GBIF provided sufficient capital to allow the banks to meet the requirements. Among the conditions for the capital provision was that the old shares in *DnB* would be written down to zero.

Table 3.2

Bank losses and provisions
As a percentage of total assets

Year	Commercial banks	Savings banks
1987	1.32	0.40
1988	2.16	0.98
1989	2.50	1.32
1990	3.25	1.21
1991	7.08	1.37
1992	3.60	1.11
1993	2.07	0.64
1994	0.19	0.21
1995	-0.45	0.10

Source: Norges Bank.

The total gross fiscal costs of the rescue operations were approximately 3% of GDP. By year-end 1993 the net fiscal costs (gross fiscal costs minus the value of the government's bank shares) were 0.8% of GDP, according to official estimates.^{59,60} NB's losses were limited,⁶¹ reflecting the larger role of the government than in the earlier crises. Creditors (other than NB) incurred losses only in the case of the bank that were placed under public administration. No depositors incurred losses.

4. Financial fragility

Section 3 presented stylised facts about booms and busts involving banking crises. In the following section, I consider whether the macroeconomic data and financial data are consistent with the financial fragility approach. Section 4.1 first considers whether each of the three crises was preceded by a considerable increase in financial fragility, followed by an unwinding of the fragility. A comparison of some indicators in the three episodes is summarised in Graphs 4.1 to 4.6. Next, I investigate whether episodes of considerable financial fragility have occurred frequently, ie in addition to those preceding crises. Finally, to control for other factors, I investigate whether a strong macroeconomic decline unaccompanied by the unwinding of financial fragility has been sufficient in creating a banking crisis. I will also try to explain why commercial banks actually increased their equity-to-total-assets ratio in the first two episodes. Section 4.2 explores the role of macroeconomic policy in the different episodes. Finally, the role of the institutional framework, the steadily wider financial safety net and thus possible moral hazard problems are considered in Section 4.3.

⁵⁹ Source: Report to the Parliament no 39 (1993-94), Ministry of Finance.

⁶⁰ Sandal (2003) presents new estimates of costs showing that the government actually made a gain ex post on its involvement in the banking sector, because it privatised the banks at higher share prices, and made unrealised gains on shares that had yet not been sold.

⁶¹ NB wrote down a liquidity loan to a smaller bank at the beginning of the crisis.

4.1 Can the financial fragility approach explain the occurrence of banking crises?

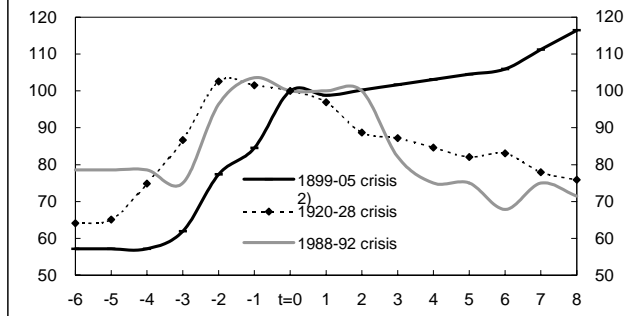
Common features

Each of the three banking crises in Norway was preceded by some common factors, reflecting increased financial fragility that was reversed in each subsequent bust.

- *There were signs of excessive competition.* One indicator of this is that the number of banks increased (Graph 4.1). This increase was small in the 1980s, eg because liberalisation made it possible for existing banks to expand rapidly through the establishment of new branches. Competition from other financial institutions and foreign banks added to the competitive pressures. Many banks adopted an aggressive lending stance in all three episodes, and started to compete for market share without taking appropriate account of risk. As a result, real bank lending growth accelerated (Graph 4.2). The average loan quality deteriorated rapidly in these booms because it is generally difficult to increase screening and monitoring capacity in a short period of time. Informational problems may have been particularly severe in cases where banks expanded into new business and geographical areas about which they had little prior knowledge. Banks that expanded the most in each boom were those most affected in the subsequent bust.⁶² Each boom created an environment in which banks' external financial constraints were lessened (the equity market in the first two episodes and foreign capital markets in the last) (Graphs 4.3-4.5). Commercial banks on average experienced deeper crises than savings banks, both because they expanded more in the booms and because they held a more risky portfolio of business loans as opposed to household loans. The crisis of 1988-92 affected savings banks to a greater extent than before, reflecting a narrowing of differences in behaviour compared with commercial banks.
- *Asset prices increased rapidly in each boom.* Each boom had its own objects of speculation. Real estate prices and the share prices of real estate-related firms rose to unsustainable levels during the latter half of the 1890s. An unprecedented speculative bubble in shares, especially shipping and whaling shares, developed during WW1. Residential and commercial real estate prices rose rapidly during the 1980s. All the asset price bubbles burst in the subsequent busts, reducing the net worth of banks and their borrowers.
- *The development of non-financial sector indebtedness provides a mixed picture.* Indebtedness increased only slightly in the first two episodes, but strongly in the last (Graph 4.6). Arguably, this difference reflects the nature of the monetary regimes. During the gold standard it was common to experience rising nominal incomes and increases in the price level during a boom in economic activity, and falling nominal incomes and declines in the price level during a bust. Consequently, when non-financial firms and households incurred debt in line with nominal incomes during a boom they were exposed to the decline in nominal incomes that usually followed, but arguably the timing of the decline could not be anticipated. Even a slight increase in indebtedness could thus represent rising financial fragility. The monetary anchor provided by the gold standard was lost during WW1. The non-financial sector incurred debt largely in line with the increase in nominal incomes during this period. However, since rising nominal incomes reflected an unsustainable monetary expansion, borrowers were exposed to a sharp reversal of nominal incomes. The reversal turned out to be larger, however, than perhaps anticipated, because of a change in monetary regime and the world recession of 1920-21. For example, nominal GDP in 1920 was not surpassed before the 1940s. During the mid-1980s, borrowers anticipating enduring nominal income increase and inflation also in busts could increase their debt more than nominal incomes in the boom. However, these expectations turned out to be too optimistic, and the consequent correction considerable. Deflation and declining nominal incomes were, however, absent.

⁶² A surge in bank loan losses is, according to Keeton (1999), highly probable when lending growth is caused by supply shifts in lending, eg because banks lower their minimum credit standards. According to Pesola (2001), it is likely that this was the case in the Nordic countries in the late 1980s-early 1990s. Arguably, it is likely that this also happened in the run-up to the crises of 1899-1905 and 1920-28. Gavin and Hausmann (1996) contend that banks incur greater risks during lending booms because they lend to new borrowers, borrowers whose cash flow is only temporarily high, and borrowers whose ability to pay depends upon the availability of credit from other banks.

Graph 4.1 Number of commercial banks. Three episodes of banking crises. Index¹⁾

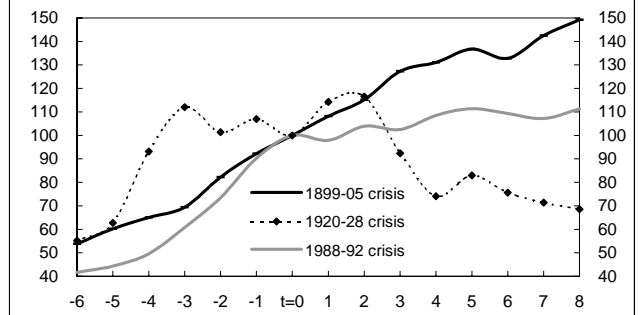


¹⁾ Index, 1899=100, 1920=100, 1987=100.

²⁾ The development in 1900-05 and 1905-10 is based on linear intrapolations, which is reasonable given the development in the number of reporting banks in this period reported in Graph 3.2.5.

t is number of years before and after beginning of crisis (1899, 1920 and 1987, respectively).
Sources: Matre (1992); Statistics Norway; Norges Bank.

Graph 4.2 Commercial bank real lending development. Three episodes of banking crises. Index¹⁾

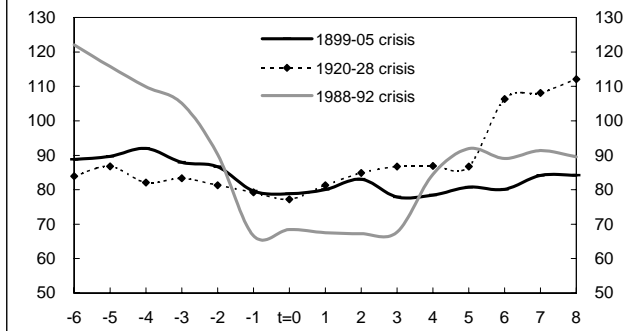


¹⁾ Index, 1899=100, 1920=100, 1987=100.

t is number of years before and after beginning of crisis (1899, 1920 and 1987, respectively).

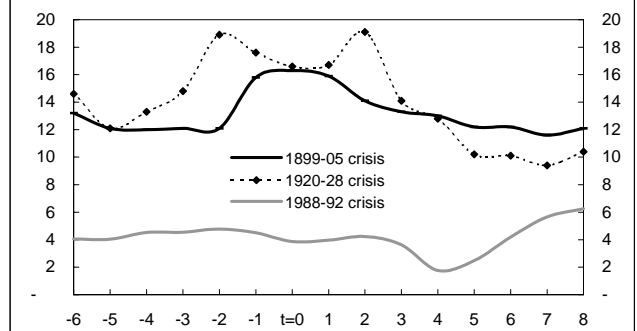
Sources: Matre (1992); Statistics Norway; Norges Bank.

Graph 4.3 Deposits from non-banks as a percentage of loans. Commercial banks. Three episodes of banking crises



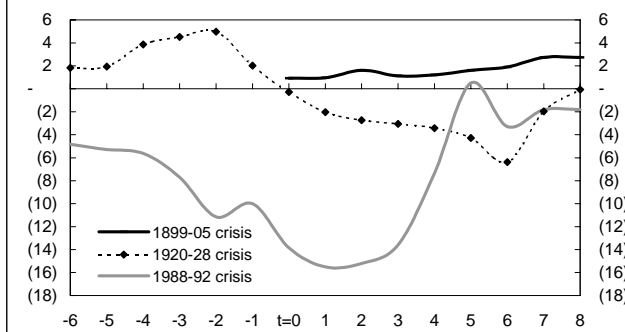
t is number of years before and after beginning of crisis (1899, 1920 and 1987, respectively).
Sources: Matre (1992); Statistics Norway; Norges Bank.

Graph 4.4 Equity as a percentage of total assets. Commercial banks. Three episodes of banking crises



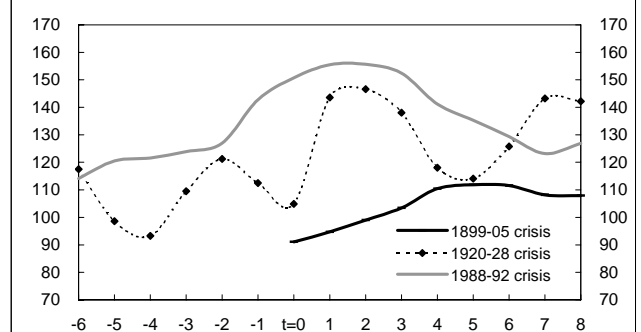
t is number of years before and after beginning of crisis (1899, 1920 and 1987, respectively).
Sources: Matre (1992); Statistics Norway; Norges Bank.

Graph 4.5 Savings and commercial banks' net foreign claims. Three episodes of banking crises



t is number of years before and after beginning of crisis (1899, 1920 and 1987, respectively).
Sources: Statistics Norway; Norges Bank.

Graph 4.6 Non-financial sector indebtedness. Three episodes of banking crises



t is the number of years before and after beginning of crisis (1899, 1920 and 1987, respectively).
Sources: Statistics Norway; Norges Bank.

Summarising, the level of indebtedness increased only slightly in the first two boom episodes, but declining nominal incomes increased the debt burden during the busts. In the last episode, the level of indebtedness increased markedly during the boom, but fell afterwards because of enduring, albeit lower, inflation and nominal income growth.

Does financial fragility build up frequently?

Financial fragility may build up frequently without leading to crises. In the Norwegian case, only one period stands out as a period of rapid real bank lending growth and increasing non-financial sector indebtedness⁶³ without a subsequent crisis, namely the couple of years after WW2. However, the expansion in bank lending represented a return to more normal conditions and a normalisation of the balance sheet rather than excessive competition and increased fragility. The reason for this is that bank lending had subsided tremendously during WW2 in nominal terms, despite a considerable nominal increase in deposits caused by monetary expansion.⁶⁴ There was also no asset price inflation after WW2.

Hence, episodes of considerable financial fragility have been rare events, and when they have occurred, banking crises have followed. This suggests a strong causal link between financial fragility and banking crises.

Can macroeconomic declines alone explain the occurrence of banking crises?

Did the banking crises occur because of particularly severe (exogenous) declines in economic activity rather than reflecting the unwinding of financial fragility? The banking crises have undoubtedly coincided with particularly severe macroeconomic declines. However, for example, the banking problems of the early 1930s appear to be small compared with the size of the macroeconomic decline.

Real GDP declined by 8% in 1931, slightly less than the decline of nearly 10% in 1921. Norwegian depositors were nervous when the Great Depression affected Norway in late 1930, and lost confidence in many banks, including banks that had been considered healthy. NB provided liquidity support. There were large bank losses in 1931, and some smaller banks failed. Nonetheless, a widespread solvency crisis was avoided. An important reason for this appears to be that there had been no build-up of financial fragility in Norway in the late 1920s. Instead, Norwegian banks had gone through a long period of restructuring, contributing to a stronger and more stable banking sector, as a reaction to the “excesses” of WW1. Bernanke (1983) highlights this point. He notes that the seriousness of the banking problems in the Great Depression in many countries was due not only to the extent of deflation (which was just as protracted during the 1920s in these countries), but also to the large and broad-based expansion of debt in the 1920s. As noted, this broad-based expansion of debt happened a decade earlier in Norway, not in the 1920s.

A change in monetary policy is also part of the explanation for better bank performance in the 1930s. NB suspended the prewar parity gold standard in 1931. Arguably, the liquidity problems would have been much more severe with considerable consequences for economic activity if NB had used all efforts to abide by the gold standard.⁶⁵ Moreover, given the presence of a financial supervisory authority and better knowledge of the banks, NB’s reaction to liquidity problems were quicker and firmer than in the early 1920s.

⁶³ Non-financial sector total debt increased from 52% of nominal GDP in 1946 to 72% in 1950. Commercial and savings bank lending (deflated by CPI) increased by 55% and 37%, respectively, in 1946. The real bank lending growth rates subsided rapidly in the four consecutive years.

⁶⁴ During WW2 the occupier’s activities had largely been financed by printing money, but banks chose to place their funds in treasury bills and bonds instead of extending loans (Skånland (1967)). In addition, the supervisory authority was on the alert for a possible speculative boom. In contrast to WW1, banks appeared to be risk-averse, perhaps because the lessons from the last speculative boom had not been forgotten, but also because they lacked profitable lending opportunities (Ecklund and Knutsen (2000)). The scope for speculative investments and rapid banking expansion after WW2 was also lower because of a gradual introduction of credit and interest rate regulation.

⁶⁵ Growth in industrial production in countries not on the gold standard averaged about 7 percentage points higher a year between 1932 and 1935 than in countries remaining on gold, according to Bernanke and James (1991). Norway is included in the study.

The fact that indicators of financial fragility increased during the boom periods preceding the three crises, and the fact that a considerable decline in economic activity by itself has not been sufficient in creating a banking crisis, suggest strongly that banking crises largely reflect the unwinding of financial fragility more than other factors.

The puzzle – why did the commercial bank equity-to-total-assets ratio increase in the first two boom periods?

A special feature of commercial bank expansion in the booms in the latter half of the 1890s and WW1 was that these expansions were backed by buoyant stock markets. By issuing new share capital, commercial banks could expand their capital base, and new banks could grow rapidly and start competing with existing banks. The stock market thus lessened the commercial banks' external financing constraints, and decoupled them from deposits. High profits and retained earnings during WW1 also contributed to increasing the equity capital at commercial banks, thereby boosting their capital basis for further credit expansion.

The equity-to-total-assets ratio is often used as a microprudential indicator of bank risk-taking. When the ratio is low, a bank puts depositors' and other creditors' money at risk. The shareholders of a bank have in this case a limited amount to lose, and potentially a lot to gain, if the bank invests in high-risk, high-return assets. Moral hazard problems may therefore arise. Nonetheless, the crises after the crash in 1899 and in the 1920s were largely confined to commercial banks. What does this suggest? Two disparate explanations may be possible.

The first explanation stresses the role of equity as a way for commercial banks to relax their financing constraints in an environment of heavy regulation on bond issuance.⁶⁶ Bond issuance was either prohibited (in the 1890s) or too heavily regulated (WW1) for banks, and in this environment the original shareholders of the banks may have been motivated to issue new equity, even though it would dilute their share, as long as profits were expected to increase proportionally more. In order to increase the probability of high profits, the banks may have been motivated to choose high-risk, high-return assets. This may help explain why all the newly established commercial banks in the late 1890s failed a few years later. To the extent that the managers of the banks also had inside ownership, this may have exacerbated possible risk-shifting problems (Esty (1997)). Mutual ownership (savings banks) represents in this case a more balanced form of control. Without inside ownership, the managers have no interest in increasing risk-taking as long as the bank is solvent. Risk-shifting problems may also have been compounded by other factors: in a booming economy, the shareholders as well as the managers may have believed that profitability would indeed turn out to be high, and that the risks involved were small. Both the bank managers and shareholders may have suffered from "disaster myopia", or may just have been extrapolating the recent trend in the stock market. In this way, banks could take advantage of the booming stock market to get "cheap" capital. Alternatively, the stock market might have been misled by the bank managers, who operated in an environment with weak corporate control and lack of transparency. This resulted in many episodes of defalcation and fraud.

The alternative explanation for the increase in the equity-to-total-assets ratio was that the banks wanted to build up cushions against future losses, eg to gain confidence among depositors. A risk-adjusted (ex ante) ratio may have shown a decrease.

Further research is necessary to shed further light on this puzzle, in particular to what extent risks were perceived as high (ex ante). Possible explanations should be seen within the context of heavy regulation on bond issuance.

4.2 Differences in macroeconomic policy

The level of financial fragility and the depth of each of the three crises in Norway differed. The crises of 1920-28 and 1988-92 were clearly systemic, while the crisis of 1899-1905 was milder.

⁶⁶ To what extent short-term money market financing (from abroad) was an important elastic source of finance for some banks is uncertain. The banks had on average higher foreign claims than foreign liabilities, at least after 1899 and during the period 1914-19.

Arguably, macro policies can account for the difference. The need for a macro policy consistent with internal and external stability during the course of the business cycle is highlighted in this section.

The period 1873 to 1914 was characterised by a stable monetary regime. The gold standard provided a monetary anchor for monetary policy, and it curtailed rapid credit expansion underpinned by discounting at the central bank.⁶⁷ Adherence to the gold standard signalled a government's commitment to sound and stable policies (Bordo and Eichengreen (2002)). In order to avoid suspension of convertibility, it was necessary to conduct a monetary and fiscal policy aiming at internal and external stability, reducing the amplitude of boom and bust cycles. Norway can be characterised as one of the core countries of the pre-1914 gold standard system, since it never suspended convertibility of notes into gold. Both currency and twin crises were hence avoided, but banking problems occurred relatively frequently.

The seriousness of the pre-WW1 crises, including the crisis of 1899-1905, pales in comparison with later crises which also involved undisciplined macroeconomic policy and currency problems. This statement does not, however, mean that there was no room for improvement in the conduct of monetary policy in the specie era. NB could perhaps have contained the boom in the latter half of the 1890s more than it did. Indeed, the amount of discounting at the central bank was very high, leading on many occasions to very low note reserves. Hence, it was thus in a dangerously weak position prior to the crash in 1899, possibly contributing to a larger increase (or correction) in the discount rate than otherwise would have been necessary. Monetary policy may therefore have been unduly procyclical.

During WW1, the gold standard was suspended and a period of rapid monetary expansion followed. Real public consumption was high in both 1914 and 1919. The boom of the first WW1 years and the brief business cycle upturn after WW1 was followed by an international deflationary spiral as a result of the world recession of 1920-21. This downward spiral was compounded by the change in monetary policy towards restoring the gold standard at the prewar parity. Temin (1989, 1993) argues that the "single best predictor of how severe the Depression was in different countries is how long they stayed on gold". The reason for this statement was the deflationary effects of the gold standard in the interwar period. Even though NB did not restore the gold standard before 1928, its monetary policy contributed to the "debt-deflation" crisis during large parts of the 1920s.

In the mid-1980s, fiscal policy was expansionary and financial deregulation facilitated strong growth in private domestic spending. Monetary policy was not aiming at containing this unsustainable boom. Altogether, the fiscal and monetary policies were not consistent with the fixed exchange rate regime. It was only towards the end of 1986 that it became clear that the interest rate should be set with the objective of securing confidence in the fixed exchange rate regime, and not be politically determined. Steigum (2003) argues that the deregulation of the credit market triggered a lending boom that made the Norwegian economy vulnerable to adverse shocks, and the vulnerability was accentuated by the exchange rate regime. From 1990 the Norwegian krone was pegged to the ECU. He argues that the procyclical monetary policy triggered by the high German interest rate in 1989-92 was decisive for the weak performance of the Norwegian economy, the deep decline in real estate prices, and the banking crises. As a result, the banking crisis coincided with the worst recession since the interwar period.

⁶⁷ The Cunliffe Committee (1918) describes this mechanism nicely: "When, apart from a foreign drain, credit at home threatened to become unduly high, the old currency system tended to restrain the expansion and prevent the consequent rise in domestic prices which ultimately causes such a drain. The expansion of credit, by forcing up prices, involves an increased demand for legal tender currency both from the banks in order to maintain their normal proportion of cash to liabilities and from the general public for the payment of wages and for retail transaction. In this case also the demand for such currency fell upon the reserve of the Bank of England, and the Bank was thereupon obliged to raise its rate of discount in order to prevent the fall in the proportion of that reserve to its liabilities. The same chain of consequences as we have just described followed and speculative trade activity was similarly restrained. There was therefore an automatic machinery by which the volume of purchasing power in this country was continuously adjusted to world prices of commodities in general. Domestic prices were automatically regulated to prevent excessive imports; and the creation of banking credit so controlled that banking could be safely permitted a freedom from state interference which would not have been possible under a less rigid currency system."

4.3 Institutional framework, financial safety net and moral hazard

Prior to the crisis of 1899-1905

A *weak institutional environment* for the financial sector, including poor accounting and auditing practices, weak corporate governance and lack of transparency, was conducive to frequent episodes of banking problems. This environment made it difficult for creditors and depositors to monitor the performance or risk-taking at the banks. It was therefore easy for bank managers to engage in defalcation and fraud, which were often one of the proximate causes for bank failures. Since such dubious activities were often easier to carry out in booms, this contributed to contemporaneous increases in financial fragility.

Prior to the crisis of 1920-28

The banking sector probably experienced a widening of the *implicit* financial safety net after the 1899 crash. First, NB was active in containing liquidity problems and it exposed itself to losses as part of an orderly reconstruction or liquidation of insolvent banks that were deemed important to the stability of the financial system. Second, the scale of the crisis entailed the involvement of the central government and the local government in Oslo. Losses to depositors and other creditors were in this way limited. This may have contributed to perceptions of an implicit financial safety net prior to WW1.

A way to reduce the risk of moral hazard arising from a financial safety net is to impose prudential regulation and supervision on banks. However, such measures were introduced too late for commercial banks to have any effect during the expansion of WW1. Commercial banks were then only subject to the law on limited liability companies of 1910, which did not entail any bank-specific regulation on risk-taking or large exposures. High commercial bank risk-taking during WW1 may thus be explained, at least in part, by moral hazard problems that were not curtailed by regulation and supervision. By contrast, savings banks were already subject to some regulation and supervision, which contained their risk-taking during WW1.

Prior to the crisis of 1988-92

A broad *explicit* financial safety net was in place prior to the expansion of the mid-1980s. Arguably, a broad *implicit* financial safety net was in place as well. Rescue operations and liquidity support by the central bank and the government in the two pre-WW2 crises may have contributed to the perception that banks of importance to the stability of the financial system would not be allowed to fail without support measures. A system with public administration (receivership) had been introduced in the interwar period to restructure or liquidate banks when different support measures could not cope with the problems, thereby relieving the pressure on failing banks and possibly contributing to moral hazard problems.

Guarantee funds of commercial banks and savings banks had also been introduced in the interwar period. The guarantee funds had wide mandates to support member banks in liquidity or solvency crisis. However, the impact of these funds on the risk of moral hazard is unclear. On the one hand, the fact that they were funded and managed by the banking groups themselves (with a minority of one representative from the central bank and Kredittilsynet, respectively), may have reduced the risk of moral hazard. On the other hand, the levies were only weakly linked to risk.

Regarding the actions of the guarantee funds in times of crisis, it was up to the discretion of the board of directors whether a bank should be supported or not. However, depositors at savings banks had an unlimited explicit guarantee, and there is reason to believe that a similar implicit guarantee pertained to depositors at commercial banks as well. Since banks were poorly capitalised, they had strong incentives to maximise the option value of deposit insurance in the wake of deregulation and excessive competition.⁶⁸

The increased role of subordinated debt explains part of the rapid bank expansion, as the bondholders had no incentive to monitor bank risk-taking. Commercial banks were reluctant to raise equity capital

⁶⁸ See Drees and Pazarbasioglu (1998).

to facilitate rapid lending growth, eg because it would dilute shareholders' control. After strong requests from the industry the government loosened capital regulation. As a result, perpetual subordinated debt was approved on an equal footing with equity for capital requirements. These changes made it possible for the banks to increase their leverage, possibly contributing to moral hazard problems by motivating a shift to higher-risk, higher-return assets. The incentives to do so were not curtailed by higher risk premia in the bond market. Among the conditions of bank issues of subordinated debt during the 1980s was that this debt could not be written down unless the bank was closed. To the extent that such conditions were coupled with possible perceptions that banks would not be allowed to close, this meant that the risk associated with subordinated debt was very limited.⁶⁹

Moreover, banks were supervised by a weak supervisory authority,⁷⁰ which reduced its on-site supervision activities at a time when the financial sector was being deregulated, banks were expanding significantly, and banks' capital positions were being reduced to historically low levels. Altogether, it appears that part of the high risk-taking at the banks in the 1980s may be attributed to moral hazard problems.

5. Policy lessons

Episodes of financial fragility appear to be an inherent feature of market-oriented financial systems. Banking problems and occasional crises may occur as a result. Avoiding banking crises and at the same time reaping the benefits of a market-oriented system have therefore been put high on the agenda of the government in many countries and in international standard-setting bodies. I would like to highlight two policy lessons: the importance of ensuring a stable macroeconomic environment and that of macroprudential regulation and supervision.

5.1 Stable macroeconomic environment

Ensuring a stable macroeconomic policy regime through the course of the business cycle (as during the gold standard era) arguably represents an improvement compared with strongly procyclical macro policies (as in later experiences). In this context, the role of the exchange rate regime may not be important per se. Contrary to the pre-WW1 decades, many countries now have floating exchange rates and inflation targeting mandates. Inflation has been brought down since the 1980s and is now stable and low in most developed countries. This environment is conducive to financial stability.⁷¹ Monetary policy aiming at price stability is forward-looking, and it will by its very nature counteract large swings in macroeconomic developments, which often coincide with disturbances in the inflation rate. Thus, a potentially procyclical fiscal policy will be also be counteracted by monetary policy.

Even so, episodes of bank distress should not be ruled out in future. As the financial sector becomes deeper and wider in many countries, even severe banking crises should not be ruled out. The reason for this is that financial sector may increase its ability to create credit, hence reinforcing boom and bust cycles by weakening external financing constraints. Consumption may react more strongly to asset price inflation and deflation as households increase their holdings of financial assets. Expansion in non-bank financial intermediation may affect banks to a greater extent than before because it may allow borrowers to increase their total indebtedness.

Borio et al (2003) contend that a credible monetary policy and supply side improvements may contribute to prolonged booms without any inflationary tendencies in the short to medium term. As a

⁶⁹ When the crisis surfaced and banks turned insolvent, subordinated debt was consequently not written down because the banks were not closed but provided with new capital. The government did not require that subordinated debt should be written down as part of crisis resolution, because it was concerned with the risk of loss of confidence from abroad, since a considerable part of the subordinated debt was provided by foreign creditors (this was also an important concern in the 1920s).

⁷⁰ Financial liberalisation has played a significant role in explaining the probability of a banking crisis in many countries, often because liberalisation came without an adequate regulatory and supervisory framework to accompany it (see for example Kaminsky and Reinhart (1996) and Demirguc-Kunt and Detragiache (1998)).

⁷¹ This is supported by a study by Bordo et al (2000) based on historical data from the United States.

result, significant financial fragility can be allowed to build up within the typical time horizon used by central banks for measuring price stability. When inflation finally picks up, the level of fragility may be too severe to be contained by monetary policy. An unwinding of this fragility could lead to a considerable economic downturn, and even deflation, as in Japan. Thus, if the private sector becomes able to create large boom and bust cycles in a stable macroeconomic environment, a way to counteract this effect is to lengthen the horizon of focus for monetary policy.⁷² Some have also argued that monetary policy should respond more directly to changes in asset prices. A consensus is, however, far from having been reached.⁷³

5.2 Macroprudential regulation and supervision

Regulation (eg minimum solvency and liquidity requirements) and supervision of individual financial institutions contributes to a safer and sound financial system by reducing the probability of financial distress at individual institutions. In particular, this kind of microprudential regulation and supervision protects the financial system against idiosyncratic risks, ie risks that affect a few banks depending on their exposures, but that may affect the financial system as a whole through interlinkages between financial institutions.⁷⁴ Most financial institutions are also exposed to systemic risks which only to a limited extent can be diversified for the financial system as a whole. Exposure to the business cycle is an obvious example. During an upturn, realised losses are small and profits high for most financial institutions. Conversely, during a downturn, realised losses are relatively high and profits low for most financial institutions. Norwegian banking history, as well as experiences from other countries,⁷⁵ suggest that systemic risk factors, such as the business cycle, are more important than idiosyncratic risks affecting individual institutions when considering the causes of banking crises.

Further, it appears that the ground for a banking crisis is laid in the boom. Often banks, investors and also supervisory authorities use a short time horizon when measuring risk (Borio et al (2001)). When realised losses are low and profits high during an upturn, risks also appear to be systematically low. This motivates banks to increase their lending. Consequently, banks may operate with too low cushions against future losses at the height of a business cycle upturn despite operating within regulatory solvency and liquidity requirements, and thus not be appropriately equipped to face a downturn. In the case of Norway, banks with an aggressive lending policy stance during an upturn have clearly been affected much more than other banks when the business cycle turned. In fact, these banks may have reinforced the booms and busts. Conversely, when losses surface and profits fall during a downturn, banks may be forced to reduce their lending to build up their capital and liquidity, and/or choose to do so because risks appear to be systematically high.

A macro-orientation of prudential regulation and supervision is therefore deemed necessary.⁷⁶ Rapid expansion in bank balance sheets (significant real bank lending growth and overextension of funding possibilities as indicated by decreased loan-to-deposit ratio), considerable asset price inflation and an increase in non-financial sector indebtedness may be used to signal impending banking difficulties.

⁷² See Borio and Lowe (2002) and Borio et al (2003) regarding the challenges of monetary policy in an environment where booms and busts in asset prices and the financial sector may play an important role in the business cycle. See also Gjedrem (2003) for a recent speech about financial stability, asset prices and monetary policy in the case of Norway.

⁷³ For example, Cecchetti et al (2003) have argued that monetary policy should respond to asset price misalignments because they lead to misallocation of resources and an unstable macroeconomic development. Goodfriend (2003), on the other hand, argues that the central bank should not respond directly to asset prices. Investigating the United States in the 1990s and Japan in the late 1980s, he finds that other data clearly signalled a need to tighten monetary policy by the time it was clear that asset prices were unduly high. Bernanke and Gertler (1999) argue that given a strong commitment to stabilising expected inflation, it is neither necessary nor desirable for monetary policy to respond to changes in asset prices, except to the extent that they help to forecast inflationary or deflationary pressure. Bean (2003) argues that the macroeconomic implications of asset price movements and/or financial imbalances can be adequately embraced within an appropriate flexible and forward-looking concept of inflation targets.

⁷⁴ See for example Hellwig (1995) and Summer (2002).

⁷⁵ For example, the banking crises in the other Nordic countries and the small-bank crisis in the United Kingdom at the beginning of the 1990s, and the S&L crisis in the United States in the 1980s.

⁷⁶ Borio (2003) elaborates on this further. See also Goodhart (2003).

A way to counteract the procyclicality of the financial system is to encourage banks to build up cushions against future, unexpected, losses during booms, so that they are not forced to tighten credit supply excessively during a bust.⁷⁷ More forward-looking credit risk measurement by banks and other financial institutions should be helpful in this respect.⁷⁸ The cushions have to reflect the build-up of risk in a bank's balance sheet during a boom, even though the probability of high losses in the near future under such circumstances is low and banks record high profits. The first two booms studied in this paper clearly illustrate that even increased equity-to-total-assets ratios at commercial banks were far from sufficient to protect them from failure because of excessively high risk-taking. To what extent bank risk-taking was perceived as excessively high at the time (*ex ante*), and thus to what extent the increased ratio reflected this, is, however, highly uncertain.

This underscores the importance of the New Basel Capital Accord. Pillar 1 provides a better link between a bank's risk-taking and its minimum required level of capital, and induces financial institutions to improve their risk measurement models. Pillar 2 assigns a particular role to the financial supervisory authority in requiring higher capital adequacy ratios than the minimum levels in risky banks, eg with the use of stress testing.⁷⁹ It is particularly important to exercise this right properly during booms, due to the low-probability nature of high losses. This is undoubtedly a challenging task, and requires sufficient resources. It is also important to have in place a strong and forward-looking supervisory authority in order to counteract the risk of moral hazard arising from the presence of an implicit and explicit financial safety net. Pillar 3 provides disclosure requirements, which contribute to strengthening market discipline by making the level of banks' risk-taking more transparent. Market discipline imposes incentives to maintain a strong capital cushion against future losses.

Central banks can contribute to increased awareness of how risks evolve over the course of the business cycle. Possible mechanisms include, for instance, publishing financial stability reports, as many countries now do, and cooperating with the supervisory authority. Speeches and regular contact with banks may also be used actively to address financial stability concerns (moral suasion).

It is challenging to strike a balance between trying to contain a financial crisis (in the short run), and reducing the risk of future moral hazard problems arising from crisis resolution. The advantages and disadvantages of different resolution techniques are described elsewhere.⁸⁰ On balance, however, the way the last banking crisis in Norway was resolved appears to have been very constructive. For example, Allen and Gale (1999) contend that the government's prompt action in restoring the banking system meant that it was quickly able to revert to performing its normal economic function. In addition, measures were taken to punish those "responsible" for the crisis, by writing down the share capital of banks that were nationalised, shifting out management, and restructuring the banks. Subsequently, a regulatory change may have underpinned market discipline: since 1997 banks have not been allowed to issue perpetual subordinated debt as tier 2 capital unless it can be written down against the bank's losses even if the bank is not closed.

6. Summary

This paper has presented macroeconomic and financial data spanning three boom and bust cycles involving banking crises in Norway over 130 years. The data largely confirm a strong causal link between financial fragility and banking crises. Indicators of fragility behave in a way broadly consistent with the hypothesis processes.

⁷⁷ For example, bank losses measured as a percentage of outstanding loans were higher in Denmark than in Norway, but because Danish banks had higher cushions against losses, eg because they provisioned against losses earlier than in the other Nordic countries, they performed far better than Norwegian banks and a systemic crisis was avoided (Vastrup (2002)).

⁷⁸ Lowe (2002) elaborates on this issue in the context of the New Basel Capital Accord.

⁷⁹ An open question remains whether measuring the Basel II adequacy ratios in the boom of the 1890s and WW1 would have reflected the high risk-taking.

⁸⁰ See Sandal (2003) and BIS (1993) on resolution techniques employed in the Nordic banking crises.

All the boom periods that preceded each of the three crises were characterised by significant bank expansion, considerable asset price inflation and increased indebtedness. The non-financial sector increased its debt only slightly more than their incomes during the first two boom periods, but subsequent deflation increased its debt burden.

Contrary to the financial fragility approach, commercial banks increased their equity-to-total-assets ratio in the two first boom episodes. There may be (at least) two disparate explanations for this puzzle. The first explanation stresses the role of equity as a way for commercial banks to relax their financing constraints in an environment of heavy regulation on bond issuance. An alternative explanation is that the commercial banks wanted to build up cushions against future losses, eg to gain confidence among depositors. Further research is called for to shed light on this puzzle.

Banking crises occurred as the high degree of financial fragility was reversed. Severe macroeconomic declines unaccompanied by the unwinding of financial fragility appear not to be sufficient to create banking crises.

Within the realm of a market-oriented financial system, it should be expected that banking problems can arise from time to time. A stable macroeconomic environment, in particular monetary policy aiming at price stability, is conducive to financial stability. The worst banking crises have been those associated with an unstable macroeconomic environment. A wider and deeper financial sector may, however, contribute to prolonged swings in macroeconomic developments, contributing to new challenges for monetary policy. This development also adds to the importance of a strong supervisory authority and a macro-orientation of prudential regulation and supervision to contain the procyclicality of the financial system.

Appendix: Data sources

Macroeconomic data:

The source for GDP, consumption and fixed investment in constant prices is the various *National Accounts* published by Statistics Norway. Combined national accounts data from 1865 to 1999 are available at http://www.ssb.no/emner/historisk_statistikk/aarbok/ht-0901-355.html. Updated annual data for the period 1970-2002 are available at http://www.ssb.no/english/subjects/09/01/nr_en/. Private fixed investment and GDP private sector, mainland Norway, in constant prices, have been used for the period 1970-2002.

Discount rate data are available at http://webster/front/statistikk/en/historisk_data/diskonto/ (Norges Bank). The source of the Consumer Price Index for the whole period 1865-2002 is Statistics Norway (<http://www.ssb.no/emner/08/02/10/kpi/1-7t.html>). Farmand's wholesale price index is reproduced in historical statistics 1994 (Statistics Norway) (http://www.ssb.no/emner/historisk_statistikk/aarbok/ht-080210-325.html.) The source for long-term interest rates 1870-2002 is Norges Bank's Troll database, which contains data for long-term bonds issued by the state-owned bank, Norges Hypotekbank, for the period 1870-1946 and long-term government bonds thereafter (see Holter (2000)).

The source for M2 is Norges Bank (http://webster/front/statistikk/en/historisk_data/historisk_pengem/). Domestic credit creation by Norges Bank (monetary base minus central bank holdings of international reserves) for the period 1865-1914 is reproduced from Klovland (1984).

Bank data:

The bank data are mainly collected from Statistics Norway (historical statistics publications of 1938, 1948, 1958, 1968 and 1994) until 1991 and Norges Bank's *Finansstatistikk* thereafter (available at <http://webster/front/statistikk/en/fiks/>). Matre (1992) is used as a source for commercial bank data (total assets, deposits and lending) for the period 1865-1900, because this source is more complete. The statistical yearbook (Statistics Norway) of 1890, 1896 and 1903 is used a source for savings bank lending in the periods 1886-90, 1891-94 and 1896-99.

Banks' foreign assets and liabilities are collected from Skånland (1967) for the period 1899-1956, different historical statistics publications (Statistics Norway) for the period 1957-92 and Norges Bank's *Finansstatistikk* for the period 1992-2002.

Asset prices:

Asset price data are not readily available. Data for share issuance in the period 1897-1902 and real estate data for the period 1892-1905 are reproduced from Hanisch and Ryggvik (1992). Residential real estate prices were unfortunately only estimated for the period 1892-99.

Keilhau (1927) constructed monthly share indices based on a sample of companies listed on the Oslo Stock Exchange, and his indices for the period 1914-26 are used as a source for asset price development for this period. Statistics Norway has published an annual all-share index after 1936 (http://www.ssb.no/emner/historisk_statistikk/aarbok/ht-1101-625.html). Residential real estate prices from 1980 are reproduced from various *Financial stability* reports (Norges Bank) (http://webster/english/publications/financial_stability/).

Non-financial sector indebtedness:

Skånland (1967) is used as a source for the non-financial sector's (households, non-financial companies and municipalities) total debt (loans from all banks, including foreign banks, and from other financial institutions, and bond debt) for the period 1865-1956. Total debt for the period 1957-91 is constructed on the basis of historical statistics 1994 (Statistics Norway), ie by combining bond data by issuer sector (http://www.ssb.no/emner/historisk_statistikk/tabeller/24-24-27.txt) and data for loans to households, non-financial companies and municipalities by sector (http://www.ssb.no/emner/historisk_statistikk/tabeller/24-24-18.txt). Norges Bank's credit aggregate C3 is used from 1992 (only C3 mainland Norway from 1995). The different credit aggregates are available at <http://webster/front/statistikk/en/k3/>.

The source for nominal GDP is the various *National Accounts* published by Statistics Norway. I have used the most updated data and standards whenever possible.

Bankruptcies:

The data source is Statistics Norway (http://www.ssb.no/emner/historisk_statistikk/aarbok/hf-1102-626.html).

References

- Allen, F and D Gale (1999): "Bubbles, crises, and policy", *Oxford Review of Economic Policy*, Vol 15, No 3.
- Bank for International Settlements (1993): "Asset prices and the management of financial distress", *BIS 63rd Annual Report*, Chapter VII, June, pp 155-81.
- Bean, C (2003): "Asset prices, financial imbalances and monetary policy: are inflation targets enough?", Paper presented at the BIS Conference on "Monetary stability, financial stability and the business cycle", *BIS Working Papers*, forthcoming.
- Bell, J and D Pain (2000): "Leading indicators of banking crises – a critical review", *Bank of England Financial Stability Review*, Issue 9, Article 3, December.
- Bernanke, B (1983): "Nonmonetary effects of the financial crises in the propagation of the Great Depression", *The American Economic Review*, 73(3), pp 257-76.
- Bernanke, B S and M Gertler (1989): "Agency costs, net worth and business fluctuations", *American Economic Review*, 79(1), pp 14-31.
- (1990): "Financial fragility and economic performance", *Quarterly Journal of Economics*, 105(1), pp 87-114.
- (1999): "Monetary policy and asset price volatility", in *New Challenges for Monetary Policy*, A symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, 26-29 August.
- Bernanke, B and H James (1991): "The gold standard, deflation, and financial crises in the Great Depression", in R G Hubbard (ed), *Financial markets and financial crises*, University of Chicago Press, Chicago, pp 69-107.
- Bordo, M D (1984): "The gold standard: the traditional approach", in M D Bordo and A J Schwarz (eds), *A retrospective on the classical gold standard, 1821-1931*, University of Chicago Press, Chicago, pp 23-31.
- Bordo, M, M Dueker and D Wheelock (2000): "Aggregate price shocks and financial instability: an historical analysis", *NBER Working Paper*, 7652.
- Bordo, M D and B Eichengreen (2002): "Crises now and then: what lessons from the last era of financial globalization?", *NBER Working Paper*, 8716, January.
- Bordo, M D, B Eichengreen, D Klingebiel and M S Martinez-Peria (2001): "Financial crises: lessons from the last 120 years", *Economic Policy*, April.
- Borio, C (2003): "Towards a macroprudential framework for financial supervision and regulation?", *BIS Working Papers*, no 128, February.
- Borio, C, B English and A Filardo (2003): "A tale of two perspectives: old or new challenges for monetary policy?", *BIS Working Papers*, no 127, February.
- Borio, C, C Furfine and P Lowe (2001): "Procyclicality of the financial system and financial stability: issues and policy options", in "Marrying the macro- and microprudential dimensions of financial stability", *BIS Papers*, no 1, pp 1-57.
- Borio, C and P Lowe (2002): "Asset prices, financial and monetary stability: exploring the nexus", Paper presented at the BIS Conference on "Changes in risk through time: measurement and policy options", *BIS Working Papers*, no 114, July.
- Calomiris, C W (1993): "Financial factors in the Great Depression", *Journal of Economic Perspectives*, 7(2), pp 61-85.
- Calomiris, C W and L Schweikart (1991): "Origin, transmission, and containment", *Journal of Economic History*, Vol. LI, pp 807-34.
- Cecchetti, S G, H Genberg and S Wadhvani (2003): "Asset prices in a flexible inflation targeting framework", in W C Hunter, G G Kaufman and M Pomerleano (eds), *Asset price bubbles: the implications for monetary, regulatory, and international policies*, MIT Press, Cambridge, Massachusetts.

Cunliffe Committee on Currency and Foreign Exchanges after the War (1918): First interim report. (Reprinted in: B Eichengreen (1985) (ed.), *The gold standard in theory and history*, Methuen, New York and London.

Davis, E P (1995): *Debt, financial fragility, and systemic risk*, Clarendon Press, Oxford.

Demirguc-Kunt, A and E Detragiache (1997): "The determinants of banking crises: evidence from developing and developed countries", *IMF Working Paper*, WP/97/106.

— (1998): "Financial liberalization and financial fragility", *IMF Working Paper*, WP/98/83.

Drees, B and C Pazarbasioglu (1998): "The Nordic banking crises, pitfalls in financial liberalisation?", *IMF Occasional Paper*, No 161, Washington DC.

Ecklund, G J and S Knutsen (2000): *Vern mot kriser? Norsk finanstilsyn gjennom 100 år*. Fagbokforlaget, Bergen.

Edison, J E and J T Klovland (1988): "A quantitative reassessment of the purchasing power parity hypothesis: evidence from Norway and the United Kingdom", *Journal of Applied Econometrics*, 2, pp 309-33.

Englund, P (1999): "The Swedish banking crisis: roots and consequences", *Oxford Review of Economic Policy*, Vol. 15, No 3, pp 80-97.

Esty, B C (1997): "Organizational form and risk taking in the savings and loan industry", *Journal of Financial Economics*, 44, pp 15-55.

Fisher, I (1933): "The debt deflation theory of great depressions", *Econometrica*, No 1, pp. 337-57.

Ford, A G (1960): "Notes on the working of the gold standard before 1914", *Oxford Economic Papers*, February, pp. 52-76. (Reprinted in: B Eichengreen (1985) (ed), *The gold standard in theory and history*, Methuen, New York and London.)

Gavin, M and R Hausmann (1996): "The roots of banking crises: the macroeconomic context", Inter-American Development Bank, *Working Paper* 318, January.

Gjedrem, S (2003): "Financial stability, asset prices and monetary policy", Speech held at Center for Monetary Economics, Norwegian School of Management, Oslo (available at <http://webster/english/speeches/2003-06-03/speech-2003-06-03.html> or at <http://www.bis.org/review/review.htm>.)

Goodfriend, M (2003): "Interest rate policy should not react directly to asset prices", in W C Hunter, G G Kaufman and M Pomerleano (eds), *Asset price bubbles: the implications for monetary, regulatory, and international policies*, MIT Press: Cambridge, Massachusetts.

Goodhart, C A E (2003): "The historical pattern of economic cycles and their interaction with asset prices and financial regulation", in W C Hunter, G G Kaufman and M Pomerleano (eds), *Asset price bubbles: the implications for monetary, regulatory, and international policies*, MIT Press: Cambridge, Massachusetts.

Gorton, G (1988): "Banking panics and business cycles", *Oxford Economic Papers*, No 40, pp 751-81.

Greenspan, A (1998): Testimony by the Chairman of the Federal Reserve Board before the Committee on Banking and Financial Services of the US House of Representatives on 1 October 1998.

Grønvik, G (1986): "Valutaterminmarkedet. Er bankenes utlånsvekst resultat av en stor etterspørsel etter kroner på termin – eller er det kanskje omvendt?", *Sosialøkonomen*, No 6.

Grossman, R S (1993): "The macroeconomic consequences of bank failures under national banking system", *Explorations in Economic History*, 30, pp 294-320.

Hanisch, T J and H Ryggvik (1992): "Eiendomskrakket i Kristiania", *Norgeskreditt*, April.

Hardy, D and C Pazarbasioglu (1999): "Determinants and leading indicators of banking crises: further evidence", *IMF Staff Papers*, 46, 3, pp 247-258.

Hellwig, M F (1995): "Systemic aspects of risk management in banking and finance", *Schweizerische Zeitschrift für Volkswirtschaft und Statistik*, Vol 131, pp 723-37.

- Herrala, R (1999): "Banking crises vs. depositor crises: the era of the Finnish markka, 1895-1998", *Scandinavian Economic History Review*, Vol XLVII, No 2.
- Herring, R (1999): "Credit risk and financial instability", *Oxford Review of Economic Policy*, 15(3), pp 63-79.
- Herring, R and S Wachter (1998): "Real estate booms and banking busts: an international perspective", presented at the Wharton Conference on Asian Twin Financial Crises, March 9-10, Tokyo, Japan.
- Hoggarth, G and V Saporta (2001): "Costs of banking system instability: some empirical evidence", *Bank of England Financial Stability Review*, Issue 10, Article 5, June.
- Holter, J P (2000): "Historisk rentestatistikk 1820-1999", *Penger og Kreditt 4/2000*, Norges Bank.
- Hutchison, M and K McDill (1999): "Are all banking crises alike? The Japanese experience in international comparison", *NBER Working Paper*, 7253.
- Kaminsky, G L (1999): "Currency and banking crises: the early warning of distress", *IMF Working Paper*, WP/99/178, December.
- Kaminsky, G L and C M Reinhart (1996): "Banking and balance-of-payments crises: models and evidence", Board of Governors of the Federal Reserve, Washington, DC.
- Kaufman, G G (1994): "Bank contagion: A review of the theory and evidence", *Journal of Financial Services Research*, 7, pp 123-50.
- Keeton, W R (1999): "Does faster loan growth lead to higher loan losses?", *Economic Review*, Federal Reserve Board of Kansas City.
- Keilhau, W (1928): *Norge og verdenskrigen*, Oslo.
- Kili, T (1996): "Aksjemarkedet in Norge 1880-1990", *Det nye pengesamfunnet* (Research on Banking, Capital and Society), Rapport nr 88, Norges Forskningsråd.
- Kindleberger, C P (1978, 1996): *Manias, panics and crashes: a history of financial crises*, Wiley, New York.
- Kiyotaki, N and J Moore (1995): "Credit cycles", *Journal of Political Economy*, 105(2), pp 211-248.
- Klovland, J T (1984): "Quantitative studies in the monetary history of Norway. Part I. Appendix A. Monetary Statistics, 1819-1983", Norwegian School of Economics and Business Administration, August.
- (1989): "A chronology of cycles in real economic activity for Norway, 1867-1914", *Scandinavian Economic History Review*, 37, pp 18-38.
- (1995): „Valutasystemer, pengepolitikk og konjunkturutvikling: De historiske bånd til Europa", in V D Norman (ed), *Europa – Forskning om økonomisk integrasjon*, Fagbokforlaget, Bergen.
- (1998): "Monetary policy and business cycles in the interwar years: the Scandinavian experience", *European Review of Economic History*, 2, pp 309-44.
- Knutsen, S (1991): "From expansion to panic and crash: the Norwegian banking system and its customers 1913-1924", *Scandinavian Economic History Review*, Vol 39.
- Lowe, P (2002): "Credit risk measurement and procyclicality", *BIS Working Papers*, no 116, September.
- Matre, H I (1992): "Norske forretningsbanker 1848-1990. En tilbakeføring av forretningsbankstatistikken". *Det nye pengesamfunnet*, Rapport nr 41.
- Minsky, H (1977): "A theory of systemic fragility", in Edvard J Altman and Arthur W Sametz (eds), *Financial crises: institutions and markets in a fragile environment*, Wiley, New York.
- Nordvik, H W (1992): "Bankkrise, bankstruktur og bankpolitikk i Norge i mellomkrigstiden", *Historisk tidsskrift*, 2, Universitetsforlaget.
- NOU (1993: 30): "Bankkrisen", Ministry of Finance, Norway.
- Pesola, J (2001): "The role of macroeconomic shocks in banking crises", *Discussion Paper 6*, Bank of Finland.

- Report to the Parliament no 39 (1993-94), Ministry of Finance, Norway.
- Rygg, N (1950): *Norges Bank i mellomkrigstiden*, Gyldendal Norsk Forlag, Oslo.
- (1954): *Norges Banks historie, Annen del*, Emil Mostue AS, Oslo.
- Sandal, K (2003): "The Nordic banking crises in the early 1990s – resolution methods and fiscal costs", Bank of England, forthcoming.
- Skånland, H (1967): "The Norwegian credit market since 1900", *Samfunnsøkonomiske studier* 19, Statistisk sentralbyrå.
- Skånland, H (1990): "Bankkrise og livet etterpå", *Penger og kreditt*, 4, pp 199-208.
- Steigum, E (2003): "Financial deregulation with a fixed exchange rate: lessons from Norway's boom-bust cycle and banking crises", Lars Jonung (ed), forthcoming.
- Summer, M (2002): "Banking regulation and systemic risk", *Working Paper 57*, Österreichische Nationalbank.
- Sundt, E (1901): "Krisen i Kristiania", in G Gran (ed), H Aschehoug & Co, Samtiden, Kristiania.
- Temin, P (1989): *Lessons from the Great Depression*, MIT Press, Cambridge.
- (1993): "Transmission of the Great Depression", *Journal of Economic Perspectives*, Volume 7, Issue 2 (Spring), pp 87-102.
- Vale, B (2003): "The banking crisis in Norway", in Jack Reidhill (ed), *Bank Failures in Mature Economies*, Basel Committee on Banking Supervision, *Working Paper*, forthcoming.
- Vastrup, C (2002): "Bankproblemer i Danmark 1984-1994", Paper presented at Kredittilsynet's "Seminar on financial crises – ten years after the Nordic banking crisis", Oslo, September.

Previous volumes in this series

No	Title	Author
141 September 2003	Financial strains and the zero lower bound: the Japanese experience	Mitsuhiro Fukao
140 September 2003	Asset prices, financial imbalances and monetary policy: are inflation targets enough?	Charles Bean
139 September 2003	External constraints on monetary policy and the financial accelerator	Mark Gertler, Simon Gilchrist and Fabio M Natalucci
138 September 2003	Public and private information in monetary policy models	Jeffery D Amato and Hyun Song Shin
137 September 2003	The Great Depression as a credit boom gone wrong	Barry Eichengreen and Kris Mitchener
136 September 2003	The price level, relative prices and economic stability: aspects of the interwar debate	David Laidler
135 September 2003	Currency crises and the informational role of interest rates	Nikola A Tarashev
134 September 2003	The cost of barriers to entry: evidence from the market for corporate euro bond underwriting	João A C Santos and Kostas Tsatsaronis
133 September 2003	How good is the BankScope database? A cross-validation exercise with correction factors for market concentration measures	Kaushik Bhattacharya
132 July 2003	Developing country economic structure and the pricing of syndicated credits	Yener Altunbaş and Blaise Gadanecz
131 March 2003	Optimal supervisory policies and depositor-preference laws	Henri Pagès and João A C Santos
130 February 2003	Living with flexible exchange rates: issues and recent experience in inflation targeting emerging market economies	Corrinne Ho and Robert N McCauley
129 February 2003	Are credit ratings procyclical?	Jeffery D Amato and Craig H Furfine
128 February 2003	Towards a macroprudential framework for financial supervision and regulation?	Claudio Borio
127 January 2003	A tale of two perspectives: old or new challenges for monetary policy?	Claudio Borio, William English and Andrew Filardo
126 January 2003	A survey of cyclical effects in credit risk measurement models	Linda Allen and Anthony Saunders
125 January 2003	The institutional memory hypothesis and the procyclicality of bank lending behaviour	Allen N Berger and Gregory F Udell
124 January 2003	Credit constraints, financial liberalisation and twin crises	Haibin Zhu
123 January 2003	Communication and monetary policy	Jeffery D Amato, Stephen Morris and Hyun Song Shin

All volumes are available on request from the BIS and are also on our website www.bis.org.