The Impact of the Norwegian State Finance Fund

Comparing Performances of Norwegian Savings Banks Before and After the Financial Crisis

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Abstract

As a result of the international financial crisis, the Norwegian State Finance Fund was established in 2009 in order to allocate capital to Norwegian banks. This master thesis evaluates the impact of these capital infusions on the Norwegian savings bank sector. By performing an econometric analysis using a matching estimator, the main objective is to detect any impact from the capital infusions on the banks' net lending growth. Secondarily, I examine what characterized the banks that applied for government support by looking at descriptive statistics. The thesis also considers how government support has been provided during previous banking crises in Norway, and makes a comparison to what has taken place this time around.

My econometric analysis reveals a significant and positive effect of 4.51 percentage points from the State Finance Fund capital infusions on the change in the supported banks' net lending growth between 2008 and 2010. However, when eliminating the two largest supported banks from the sample, the result is still positive, but only close to significant. Thus, the effect seems to be somewhat less accentuated than the effect of 4.75 percentage points increase in lending growth for 2010 forecasted by the State Finance Fund itself. As for the characteristics of banks in need of government support, savings banks applying for capital in 2009 were by and large in worse financial health than their non-applying counterparts. This is evidenced by parameters such as capital adequacy ratios, deposit/loan ratios, profitability ratios and cost/income ratios.

The thesis further discusses the reasons behind these results and what would have happened in the absence of the State Finance Fund. It further suggests some policy implications based on that discussion.

Finally, the thesis concludes that the State Finance Fund played an important role in the resolution of the financial crisis in Norway in 2009, but its impact on lending growth is not necessarily as clear-cut as the Norwegian authorities had hoped for.

Preface

This master thesis is written as part of a Master of Science in Economics at the Norwegian School of Economics. The thesis is worth 30 ECTS credits and corresponds to a full semester's studies.

My interest for the banking sector was sparked when working with financial institutions at Citigroup in 2010. Further spurred by the pivotal role banks maintain in relation to the Euro-zone debt crisis, it was clear that banks was to be a central part of my thesis. When it was brought to my attention that little research had been done on the Norwegian savings bank sector in the aftermath of the financial crisis, all that was left was to find the most interesting research question. Doing my major in economics, the link between the government and the banking sector was of particular interest to me, and the Norwegian State Finance Fund appeared as a natural object of research.

In terms of the thesis' potential weaknesses, one could argue that the econometric model is not appropriately treating the self-selection bias. I nevertheless assert that my model is adjusted in such a fashion as to take the self-selection bias into account to the greatest extent possible. Further to this, it is generally impossible to account for all factors in any program evaluation study. Mine is probably no exception to this.

Working on this thesis has been a very interesting exercise. This document would, however, never have become what it is without the qualified guidance of my supervisor Krisztina Molnár, to whom I am most grateful. I would also like to emphasize my appreciation for the work done by the Norwegian Savings Banks Association and Finance Norway (Finansnæringens Fellesorganisasjon) in gathering and publishing the data. Finally, I wish to extend my thanks to my family, my girlfriend and my friends for their continuous interest and support.

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Thomas Holsten Leren

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Abbreviations

CBGF – Commercial Banks' Guarantee Fund (Forretningsbankenes Sikringsfond)

FSA – Financial Services Authority Norway (Finanstilsynet)

GBIF – Government Bank Insurance Fund (Statens Banksikringsfond)

SBGF – Savings Banks' Guarantee Fund (Sparebankenes Sikringsfond)

SBIF – Government Bank Investment Fund (Statens Bankinvesteringsfond)

SFF – Norwegian State Finance Fund (Statens Finansfond)

1 Introduction

1.1 Background and research questions

In February 2009, triggered by the global financial crisis, the Norwegian parliament voted to establish the Norwegian State Finance Fund ("Statens Finansfond") with a total capital of NOK 50bn. During the summer and fall of that year, 27 Norwegian savings banks applied for and received 4.1 of those 50bn. The remaining 92 savings banks decided they had no need for such additional capital[1].

The official objective of the Norwegian State Finance Fund (SFF) was to strengthen the Norwegian banking sector and by doing that ensure credit growth levels as close to normal as possible. The Norwegian State Finance Fund wrote in its annual report for 2009 (p.17) that expected (weighted) average annual lending growth for the supported banks would have been 1.77 % by year end 2010 without capital infusions, whereas they now expected the banks, having received additional funding, to attain a growth of 6.52 % by year end 2010 based on the banks reporting of planned growth (see Figure 1) (Norwegian State Finance Fund, 2009). In other words, the State Finance Fund estimated a positive effect of 4.75 percentage points on the supported banks' lending growth in 2010.

Figure 1: Weighted average of net lending growth with forecasts. Gross loans as weights.
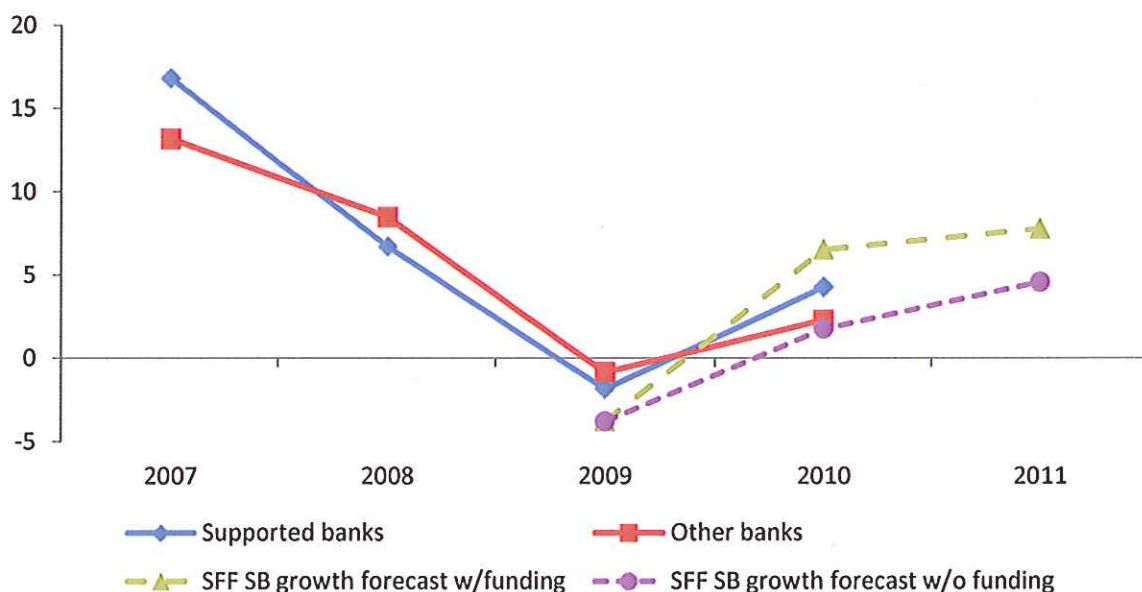
Note: The dashed green line is the SFF's forecast for the supported banks with additional capital, whereas the dotted purple line is the corresponding counterfactual scenario. The difference in 2009 values between the SFF forecast and my calculation is due to my sample containing fewer banks (see section 6).

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[1] Five of these savings banks received support through the Norwegian State Bond Fund.

This thesis examines the financial health of the savings banks that received government support versus the ones that did not on a pre-crisis basis, before analyzing the impact of the capital allocated by the Norwegian State Finance Fund. The choice to focus exclusively on savings banks and the SFF was natural for several reasons. First of all, the savings banks possess a special and central position as lenders to firms and individuals in many local communities, and therefore have an unquestionable importance to the well-functioning of the Norwegian economy. Secondly, a substantial number of savings banks applied for government support in 2009, of which as many as 27 through the SFF. However, most commercial banks and nine savings banks in need of capital found it more advantageous to opt for the Government Bond Fund[2]. This fund was established simultaneously and participated in bond issues on strictly commercial terms alongside other investors. Conducting a similar program evaluation study of the Government Bond Fund would be interesting as well, but doing both is beyond the scope of this master thesis. Finally, the savings banks vastly outnumber the commercial banks in general, which ensures a better statistical validity of the analysis.

The main finding of this thesis is a positive effect of 4.51 percentage points from the State Finance Fund capital support on the supported banks' net lending growth rates. This is found by estimating the counterfactual scenario for the supported banks using a matching estimator on individual bank data for the Norwegian savings bank sector. However, the effect is rendered smaller and only close to significant when excluding the two largest banks from the sample. A second finding is that the banks who received capital from the State Finance Fund in 2009 were, on average, in worse financial health than their counterparts prior to the crisis. The latter conclusion is based on aggregated data for several financial indicators like Tier 1 ratio[3], cost/income ratio and profitability ratios.

My main contribution to existing literature on Norwegian savings banks is therefore twofold. Firstly, this thesis analyzes the actual impact of the capital allocated by the State Finance Fund and thus contributes to the extensive research that has been carried out pertaining to the Norwegian banking sector and its crises, as for example the Commission on the Financial

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[2] Nine savings banks received capital from the Government Bond Fund, of which three also received capital from the State Finance Fund. All of these nine banks have been removed from the sample in order not to confound the effect of the capital from the Government Bond Fund with the effect of the State Finance Fund capital, the latter being the one of interest here.

[3] A Tier 1 ratio is a ratio of core capital to risk-weighted assets. See section 3.2 for further explanation.

Crisis (2011), Steigum (2010, 2004 and 1992), Gerdrup (2004), Sandal (2004), Schwierz (2004), Vale (2004), Wilse (2004), Knutsen & Lie (2002), Ecklund & Knutsen (2000), Ongena, Smith, & Michalsen (1999), Berg & Hexeberg (1994), Grønvik (1994), Nordvik (1993 and 1992) and Tjaum (1990). Secondly, as far as I am aware, this is the first study to employ a matching estimator to analyze Norwegian banking sector data (for international examples, see Ayyagari, Demirgüc-Kunt, & Maksimovic (2008) on the financing of Chinese firms or Parinduri & Riyanto (2007) on Indonesian banks). The advantage of such a method compared to looking at graphs with aggregated numbers like Figure 1, is that it isolates the treatment effect of interest instead of plainly looking at the difference in averages, which might be caused by many things other than the treatment itself.

Consequently, this thesis will treat two main research questions:
(1) What characterized the banks that chose to apply for, and received, government support in 2009?
(2) What effect, if any, did the government support have on the supported banks' lending growth compared to the non-supported banks?

When doing research, it is intuitive to offer a thought as to which result one expects. Given that the government capital support came with conditions as for instance cut in dividends and freeze in executive pay (see section 5.3.3), it is logical to presume that only the banks that really needed it would apply for it. Thus, my hypothesis regarding research question (1) is the following:
Hypothesis (1): The banks choosing to apply for government support showed inferior results on all indicators of financial health compared to the non-applying banks.
Whether this hypothesis can be confirmed or not will be pursued in the first part of the analysis; sections 7 and 8.

As for research question (2), previous literature can offer some suggestions as to what effect of government support I might expect to find. Chapter 3 "The Nordic banking crises in the early 1990s – resolution methods and fiscal costs" by Sandal (2004) in "The Norwegian Banking Crisis" edited by Moe, T.G., J.A. Solheim and B. Vale, describes the post-crisis

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development of the banks subject to government funding[4] (SB) compared to that of the other banks[5] (OB). The author observes the following (quote):

"The development in annual lending growth is similar for SB and OB (…)"

In addition to being empirically based[6], this statement is logical insofar as it is natural to assume that the recipient banks, being in general decline, would have experienced a more negative lending growth *without* support, and therefore might be approximately at the same level as the reference banks *with* support. Based on the statement above and on the previously mentioned expected effect stated by the State Finance Fund, my hypothesis regarding research question (2) reads as follows:

Hypothesis (2): The capital allocated by the State Finance Fund has had a positive effect on the supported banks' net lending growth.

Part II of the analysis will pursue whether this hypothesis can be confirmed or should be rejected.

1.2 Definition of net lending growth

It is in place to define the term net lending growth already in the introduction due to its central role hereafter. Loans on a bank's balance sheet consist of gross loans to all individuals and businesses. Net loans are gross loans adjusted for write-downs. The annual growth in net loans is what will be referred to as net lending growth throughout the thesis.

1.3 Structure

Before embarking on any analysis, section 2 provides the reader with some background knowledge regarding the Norwegian savings bank sector, section 3 lays out the funding structure of a bank and the concept of regulatory bank capital, section 4 presents previous Norwegian banking crises and related government measures while section 5 gives a brief description of the financial crisis of 2007-2009 in Norway as well as an introduction to the features of the Norwegian State Finance Fund. Section 6 then presents the data on which the thesis is based. The first part of the analysis starts with section 7, which contains descriptive

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[4] Effectively state ownership; applies to DnB and Christiania Bank (Nordea).
[5] Fokus Bank is excluded.
[6] It should be noted, however, that the author of "The Nordic banking crises in the early 1990s – resolution methods and fiscal costs" has not performed any statistical analysis, but has merely looked at the average lending growth rates.

statistics of a number of measures of financial health, and thus provides a basis of knowledge for an answer to research question (1). Whether hypothesis (1) can be confirmed or not is discussed in section 8. Section 9 commences the second part of the analysis by going through the pertinent methodological issues. Section 10 reports the results from the econometric analysis on which a conclusion to research question (2) may be reached, before discussing reasons why I find these particular results. Section 11 compares my findings to previous banking crises, whereas section 12 lays out some implications for policymakers. Section 13 concludes the thesis.

2 The Norwegian savings bank sector

This section will give a brief explanation of the features of a savings bank before putting the savings banks in a historical context. Finally, a presentation of the Norwegian Banks' Guarantee Fund will be provided.

2.1 What is a savings bank?

The Norwegian Savings Bank Law ("Sparebankloven") states that a savings bank is a bank whose purpose is to promote saving by accepting deposits from an indefinite group of depositors and manage these deposits without paying dividend to anyone except interest on paid-in primary capital. It can be founded by a group of 20 people or one or several counties ("kommuner") as long as there is primary capital of at least EUR 5 million in place (§2). Moreover, the headquarters of a savings bank, as well as a retail office, must be located in Norway. However, branches of international banks can be given disposal by the Norwegian Financial Services Authority (FSA) to use the term savings bank as long as it is regulated in a comparable fashion in its home country (§3). A savings bank's highest organ is the Supervisory Board ("Representantskap"/"Forstanderskap"), on which the equity certificate owners must have a representation between 20 % and 40 %. Additionally, the Supervisory Board composition should mirror the bank's customer structure as well as take into account relevant interest groups and the bank's social function (§8). A savings bank cannot own more than 4 % of its total assets in shares or ownership interests, nor can it own more than 4 % of total assets in property or companies with the purpose of owning or exploiting property (§24) (Norwegian Savings Bank Law, 1961).

As a matter of fact, most of these features also apply to commercial banks (Norwegian Commercial Bank Law, 1961). The main difference between the two types lies in the ownership structure. A commercial bank is owned by its shareholders, just like a normal company, whereas a savings bank is a self-owned entity. This means that no one had the right to any dividend from any savings bank until 1988, when the savings banks were allowed to issue primary capital certificates (called equity certificates since 2009) in order to make funding more easily available. Prior to that, the entire profit was retained and accumulated as equity on the balance sheet. Since 1988, the owners of primary capital/equity certificates have been admitted a certain share of the profits. The second difference from a commercial bank is

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that a savings bank is traditionally a local bank, although this is changing slowly. A savings bank is normally well anchored in a certain district and considers having a certain social responsibility for the local or regional community (Norwegian Savings Banks Association). Thus, a savings bank is allowed to allocate 60 % of its profits to social contributions and dividends, whereas the rest must be retained as equity. Both retained earnings and equity certificates count as Tier 1 capital (see section 3.2).

2.2 The historical role of Norwegian savings banks

Although, as mentioned, savings banks are a local and regional phenomenon, this was even more so in the early 20th century. Throughout their history, the savings banks have upheld their position as local lenders and community contributors. In the early 20th century, savings banks were of great assistance to farmers, craftsmen and other small businesses. Many businesses that would otherwise not exist got the necessary credit from their local savings bank. The structure of these banks was well adjusted to the social democratic countryside culture; capitalistic motives were not inherent in the banking culture and the main benefactors were, in addition to the local community in general, the depositors (Nordvik, 1993).

Since the 1920s and throughout the 1950s, there were a steady number of around 600 savings banks in Norway (Norwegian Savings Banks Association), not a lot less than the number of counties, which was around 740 during this period (The Norwegian Ministry of Regional Affairs). From the 1960s and onwards, the number of savings banks saw a steady decline due to the need for better banking competencies and more voluminous balance sheets in order to cope with bigger clients. The result was numerous mergers and acquisitions as a consolidation of the industry took place. The number of counties decreased as well, but only down to 435 (1994), whereas there are no more than 114 savings banks as of 2010.

2.3 The Norwegian Banks' Guarantee Fund

On June 25, 2004, the Savings Banks' Guarantee Fund and the Commercial Banks' Guarantee Fund merged to become the Norwegian Banks' Guarantee Fund (Bankenes Sikringsfond). All Norwegian banks are members of the fund by mandatory membership, and its main purpose is to ensure the guarantee of deposits in member banks up to NOK 2 million per customer per bank. The fund is further responsible for managing situations when one or several banks encounter difficulties, and provides advisory services to small banks as part of its normal

business. The Banks' Guarantee Fund does not, however, possess sufficient capital to cope with the needs of a whole banking sector in times of crisis. If such a situation should arise, agreements with Finance Norway (FNO) and the Norwegian Savings Banks Association (NSBA) ensure the allocation of more capital to the fund.

Aid from the Guarantee Fund is only given when considered the least expensive alternative left, also compared to public administration. In such cases, support can be given through the following measures:

- Liquidity support
- Guarantees for loans or for meeting other commitments
- General guarantees for a bank's total commitments
- Acquiring assets
- Infuse equity or put up an equity guarantee in order to ensure the continued existence, or the orderly liquidation, of a bank

Moreover, when providing support, the Guarantee Fund normally lays out a set of demands for the supported bank(s):

- Merger talks
- Changes in executive management and board
- Liquidity support is only given against security
- If the equity is partially or entirely lost, a new status review is required
- Equity support should not be granted unless calculated losses are covered by share capital/equity certificate capital
- Holders of subordinated loans and bonds must also be charged before the Guarantee Fund can contribute
- Other, non-guaranteed, creditors might also be required to participate in a solution. Examples of these could be bond holders, other banks and other professional creditors

In any case, support from the fund will only be given if the remaining capital including future member payments is sufficient to cover the deposit guarantee. (Norwegian Banks' Guarantee Fund)

3 Funding structure and bank capital

3.1 Bank funding structure

This section will give a brief overview of a bank's funding structure. Although some elements are similar, the balance sheets of a bank and a company are quite different. A retail bank like the Norwegian savings banks is funded mainly through the following sources:

- The general public (retail deposits)
- Companies (small, medium and large corporate deposits)
- Other banks (interbank deposits)
- Equity issues (share issues, conferring ownership rights on holders)
- Debt issues (bond issues and loans)
- Saving past profits (retained earnings)

These elements constitute the capital and liabilities of a bank, which in turn fund the banks' assets, being

- Cash
- Liquid assets (securities)
- Short-term money market instruments (f.ex. government bonds)
- Loans to customers
- Other investments
- Fixed assets (branch network, IT solutions and hardware, premises)

Deposits constitute the most significant part of a bank's funding structure, and they can be split in terms of type as well as in terms of source (as seen above). A bank distinguishes between sight deposits and time deposits. Sight deposits are the most short-term funding, where the entire balance is accessible on demand or at close of business the day after the deposit was made, all without penalty. Time deposits comprise all other kinds of deposits.

Since a bank is so dependent on the deposits funding its lending and its other business, it is indeed dependent on the financial markets and on the general public's sentiment towards the bank. Market deterioration and bank runs[7] might cause a bank to incur unprecedented losses and converge towards insolvency. The possibility of this happening causes the financial

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[7] A bank run is what happens when people are withdrawing their deposits, i.e. the bank's primary funding source, in order to avoid a situation where the bank loses their money.

services authorities to require banks to hold a certain amount of capital to avoid cases of insolvency. The minimum capital required will then be able to absorb losses to a greater extent than what would necessarily have been the case in the absence of such requirements. (Casu, Girardone, & Molyneux, 2006)

3.2 Regulatory bank capital

This section will, based on the Norwegian regulation for calculation of regulatory capital (The Norwegian Ministry of Finance, 1991), give a brief overview of the different types of regulatory bank capital.

Norwegian law acknowledges the difference between Tier 1 capital ("Kjernekapital") and Tier 2 capital ("Tilleggskapital"), where equity and some types of hybrid capital are considered Tier 1 capital, whereas less equity-like types of hybrid capital as well as long-term bonds are considered Tier 2 capital. Norwegian banks are required to hold a minimum total regulatory capital (Tier 1 + Tier 2) of 8 % of total risk-weighted assets (RWA). RWA is a calculation of the value of a bank's assets where the assets are given different weights according to the assumed riskiness of the asset. A more risky asset will be given a greater weight and will thus require more regulatory capital as "insurance".

Tier 1 capital can in turn be split into *core Tier 1 capital* and *other Tier 1 capital*. *Core Tier 1 capital* comprises the following types of capital in the case of Norwegian savings banks: (1) Share capital, (2) primary capital certificates (PCC)/equity certificates (EC), (3) retained earnings and (4) fund for unrealized capital gains. Furthermore, *other Tier 1 capital* can, if fulfilling certain requirements, be (1) hybrid capital with perpetual maturity and moderate incentives for redemption, (2) hybrid capital with 30 years maturity and no incentives for redemption but where the requirement of no redemption can be suspended, (3) hybrid capital with perpetual maturity and no incentives for redemption and (4) hybrid capital that cannot be redeemed and that can be converted into ordinary shares or PCC/EC.

Hybrid capital approved as Tier 1 capital needs to comply with the following requirements:

- Be fully paid in, unsecured and junior to subordinated debt
- Be approved ex ante by the FSA

- Issuing bank cannot redeem the capital without approval from the FSA, and lender cannot require the capital to be redeemed prior to maturity
- Issuing bank does not have the right to redeem the capital unless five years have passed since initial issuance (10 years for capital with moderate incentives for redemption, never before maturity for capital with fixed maturity date)
- Issuing bank has the right to defer interest payments, which must also be non-cumulative. Moreover, if the bank's capital adequacy ratio is in breach with minimum requirements, obligation to pay interest lapses
- Capital shall absorb losses at same rate as equity, or be convertible into equity, in the case where a bank has a Tier 1 ratio below 5 % or a total regulatory capital ratio below 8 %
- Convertible capital shall be converted to equity if bank breaches minimum capital requirements

Tier 2 capital, on the other hand, comprises (1) hybrid capital that does not meet the requirements mentioned in the paragraph above, i.e. that does not sufficiently resemble equity and (2) subordinated debt with perpetual maturity which must be both explicitly approved by the FSA, not redeemable on creditor's request and containing loss-absorbing capacity and an option for interest payment deferral. Additionally, Tier 2 capital can also be (3) subordinated debt with a maturity of at least 5 years subject to approval from the FSA and which must fulfill several other requirements and (4) 45 % of net unrealized gains on stocks and ownership interests classified as available for sale.

Moreover, Tier 2 capital cannot add up to more than 100 % of Tier 1 capital after additions and deductions, and subordinated debt with fixed maturity cannot correspond to more than 50 % of Tier 1 capital. Finally, other Tier 1 capital cannot at any point account for more than 50 % of total Tier 1 capital (The Norwegian Ministry of Finance, 1991).

The capital infused from the State Finance Fund is in almost all cases hybrid capital with perpetual maturity, non-cumulative deferrable interest payments and loss-absorbing capacity at same rate as equity; in other words, other Tier 1 capital.

4 Previous banking crises in Norway

The Norwegian banking sector has seen several crises since the creation of the first bank, the Bank of Norway, in 1816 (Nordvik, 1993). The various crises have been due to various reasons, and they are always a product of their time. No crisis perfectly resembles another, and thus we can never be completely sure to avoid further crises in the future. Nevertheless, it is instructive to have a look at what have been the main reasons behind, the main features and the main consequences of the previous Norwegian banking crises. Common denominators have been significant bank expansion, considerable asset price inflation and increased indebtedness (Gerdrup, 2004). Since this thesis is assessing the effect of state intervention in the banking sector, it would not be complete without a comparison with former state interventions. In order to facilitate such a discussion, I will also present the measures put in place by the Norwegian government as a reaction to previous crises. First of all, however, a short note on the reasons behind a banking crisis.

4.1 What causes a banking crisis?

The following paragraph is drawn in its entirety from chapter five, "Three booms and busts involving banking crises in Norway since the 1890s" by Karsten R. Gerdrup (Gerdrup, 2004) in the book "The Norwegian Banking Crisis", edited by Moe, T.G., J.A. Solheim and B. Vale. The section is so well written and gives such a consise description of the causes of banking crises, that it would not make any sense to reformulate it.

"According to the financial fragility approach, eg. as described by Davis (1995), banking crises are a response to previous "excesses". The boom 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. A change in the perception of the future outlook, an interest rate increase or some adverse economic shock finally ends 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." (Gerdrup, 2004)

4.2 Real estate boom and bust – commercial bank failures (1899-1905)

The first real Norwegian banking crisis[8] occurred at the turn of the 20th century, after a rapid expansion of the banking sector during the preceding decades. Oslo, the capital, and several other large cities experienced soaring real estate prices at the end of the 1890s. At the same time, the number of Norwegian commercial banks close to doubled between 1898-1900 as a result of the building boom (Nordvik, 1993), and the density in Oslo increased particularly. As the real estate market crashed in 1899, the banks stayed in the game thanks to liquidity support from Norges Bank (the Norwegian Central Bank) and continued growth in markets abroad. Eventually, as the international economy experienced a downturn towards the end of 1900, the Norwegian economy could not withstand and was subject to deflationary pressures and a broader downturn. Many banks had vast exposures to the real estate sector, and were thus forced to take losses as individuals and firms were unable to pay down their debts (Gerdrup, 2004).

4.2.1 Government support and lending growth development

Consequently, since the crisis was more accentuated around Oslo than elsewhere, the commercial banks in Oslo were hardest hit. Of all the recently established commercial banks in the capital, none survived, and most others incurred substantial losses (Ecklund & Knutsen, 2000). So, how did the authorities react to this crisis? As already mentioned, Norges Bank gave more liquidity support to banks after the real estate crash, but the discount rate was actually raised until 1900 before it was decreased. It does not seem to have been any direct government interventions during this crisis (Gerdrup, 2004).

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[8] There had been examples of banking problems prior to this, but not at the same level. Examples are regional problems in the Oppland region in 1864, and the first bankruptcy of a commercial bank in 1886 (Gerdrup, 2004)

Figure 2: Real bank lending growth[1].

—— Commercial banks   ······ Savings banks   *) The vertical dotted lines represent the
                                                  beginning of each crisis
[1] Deflated by CPI. Only average CPI per year was available until 1920
Sources: Matre (1992), Statistics Norway and Norges Bank
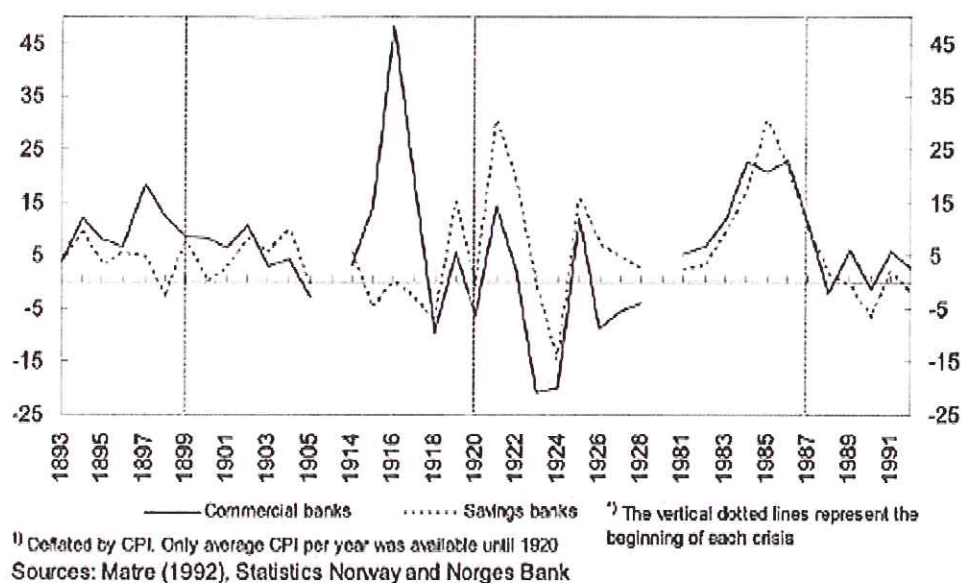
Note: Year-end data. Percent. 1893-1905, 1914-28 and 1981-92*. Source: Gerdrup (2004)

How was lending growth affected? Savings banks decreased their lending growth sharply after 1899 (see Figure 2), resulting in zero-growth in 1900 before returning to 1899-levels in 1902. It should be noted that the savings banks' aggregated lending growth rate seems fairly volatile, and was actually negative in 1898. With regards to commercial banks, their aggregated lending growth rate increased steeply in 1897, before seeing a steady decline from 1897-1901. It continued, after a short rise, to fall until it reached negative levels in 1905. As a general note, the banking crisis definitely affected lending growth levels for both savings banks and commercial banks.

4.3 World recession and path to pre-war gold parity (1920-1928)

The banking crisis of the 1920s was primarily caused by the volatile state of the Norwegian economy during World War I (WWI), the very loose regulation and supervision of Norwegian commercial banks (only subject to the Law on Limited Liability Companies of 1910) and the international deflationary pressures arising in the early 1920s. The perilous state of the economy was sustained, however, by the monetary policy conducted by Norges Bank. The central bank wanted the Norwegian krone to attain its previous par value under the gold standard, and thus kept the discount rate at relatively high levels (Gerdrup, 2004).

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The number of commercial banks saw a similar development during WWI as the years prior to 1899, as it increased from 125 in 1914 to 200 in 1918. Nevertheless, this was to be partly reversed during the 1920s, as about 50 banks had to close down in this period. The increase in the number of savings banks was more steady, as had been the case for several decades. This development continued also throughout the 1920s (Gerdrup, 2004).

4.3.1 Government support and lending growth development

Norges Bank supported banks in difficulties with liquidity loans, deposit guarantees and subsequently with preference capital in order to avoid bank runs and improve solidity (Ecklund & Knutsen, 2000). On Norges Bank's initiative, The Norwegian Bank Association (Den norske Bankforening[9]) established a committee to support Norges Bank in questions regarding bank support. In doing this, Norges Bank succeeded in bringing the private banks on board for several rescue missions. At the same time, it kept the discount rate high in periods, thus counteracting itself to a certain extent. Norges Bank was very central in coordinating the efforts to support flailing banks, and financed the first rescue missions without government aid. However, as the banks' need for capital increased in 1921, the Ministry of Finance was involved to a greater extent. Consequently, the Storting voted in 1921 to allocate NOK 15 million to be deposited in private banks to ensure liquidity. This was extended to 25 million in 1922. Furthermore, the government participated in lending NOK 16.7 million in subordinated loan capital to Centralbanken for Norge (the 2nd largest bank at the time) in March 1922 as well as NOK 34 million in subordinated loan capital to Foreningsbanken (the largest bank) in October the same year (Ecklund & Knutsen, 2000).

In addition, the Storting voted to implement a new Administration law (Administrasjonslov) on Norges Bank's initiative. The objective of this was to let banks in difficulties apply to be taken under public administration. Such banks would then continue to do business almost as usual while an administrative board considered different solutions. If the bank was actually in good health, it would be reconstructed. If not, it would be wound down in an orderly fashion. In the end, 47 commercial banks and 19 savings banks were placed under public administration between 1923 and 1928. (Ecklund & Knutsen, 2000)

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[9] This association was the commercial banks' association, as opposed to The Norwegian Savings Banks Association.

What effect did then the crisis and the measures put in place by the authorities have on the banks' lending growth? First of all, lending growth rates were extremely volatile in the period of 1914-1928 (see Figure 2), both regarding savings banks and commercial banks. However, commercial banks saw lower rates in general, reaching the ultimately low level of about -20 % in 1923-24, whereas the average rate for savings banks touched -15 % in 1924 before rising to positive levels directly.

4.4 Deregulation and banking crisis (1988-1993)

4.4.1 Causes for the crisis

In order to explain the sequence of the crisis between 1988 and 1993, we need to look at several factors. Norway had a politically set nominal interest rate until 1986, and a tax system which resulted in a negative after-tax interest rate. This obviously fuelled borrowing both by households and firms resulting in, among other things, a negative household savings rate between 1985 and 1989. A wage settlement in 1988 led to a substantial increase in wages. Elevated unemployment rates followed suite, as well as a decline in household consumption and asset values. The beginning of the recession was further accentuated by Norges Bank's fixed exchange rate policy, which forced the central bank to keep the interest rates high throughout the turn of the decade. This brought inflation down and augmented savings rates, but it also caused a lack of credit to Norwegian households. (Steigum, 2004)

To further explain the banking crisis, it is crucial to look at changes in banking regulation in the mid-80s. The Norwegian banking sector had been regulated through quantitative lending quotas and a cap on interest rate since the 2nd World War. A liberalization of credit regulation took place, and its most prominent features were the abandonment of quantitative limits on lending in 1984, followed by the cap on lending rates being lifted in 1985. This introduced a competitive credit market previously unknown to the Norwegian banking sector and its players. The immediate consequence was a fight for increased market share through more aggressive lending (Steigum, 2004). Real 12-month growth rates for bank loans hovered above 20 % for all but one quarter between December 1984 and September 1986 (Vale, 2004), carrying proof of a recently deregulated market. An increase in private consumption followed, as well as booming real estate prices (Steigum, 2004).

In such a booming credit market, was all the credit supplied to credit worthy clients? Several indications point in the direction of very loose credit policy in many banks. Norwegian bankers were not experienced in making credit decisions in such a market. Blinded by the battle for market shares, several banks expanded into new geographical areas, opened branches, and in turn delegated control of credit decisions to branches staffed by less competent bankers. It might seem like many banks were lending too much, too quickly, to too many clients not able to service such credit (Steigum, 1992).

In addition, the number of on-site inspections carried out by the supervisory authorities was scaled back prior to the merger of the Inspectorate of Banks and the Insurance Council into the Banking, Insurance and Securities Commission (BISC) in 1986. As the banks started showing signs of weakness towards the end of the decade, the Commission reintroduced more on-site inspections, but without the necessary resources to attain a pre-deregulation level (Vale, 2004) nor the necessary competence to discover and reprimand the bad banking behavior taking place in the sector (Steigum, 1992).

4.4.2 The failure of banks and the guarantee funds

The banking crisis of the early 1990s were hard on both savings banks and commercial banks. The first banks to fail were smaller local and regional banks, of which the very first was a medium-sized regional commercial bank in the fall of 1988. 12 other banks followed suite before 1990 ended, most of which were savings banks. All of these were merged into or acquired by larger banks, and as the crisis was not yet deemed systemic, government measures were not judged necessary. This changed towards the end of 1990, when the crisis hit the larger banks to a greater extent. Their solvency and liquidity situations deteriorated, and by October 1991 several of the largest banks had in effect lost all their equity. Den Norske Bank (DnB), the largest commercial bank, had also lost a significant amount of capital, and there was at this stage no doubt that the crisis had taken on a systemic dimension (Wilse, 2004).

One reason why the Norwegian authorities delayed intervention was that there were already several safety measures in place. Not only was Norges Bank an effective lender of last resort, the banks also had their own guarantee funds (Steigum, 1992). The Savings Banks' Guarantee Fund (SBGF) and the Commercial Banks' Guarantee Fund (CBGF) both had a mandatory

membership policy, and they accumulated capital through annual premium payments as well as guarantees from all member banks. The purpose of both these funds was to insure all deposits made by non-banks and thus avoid bank runs and general uncertainty in the case of a flailing bank. As opposed to similar funds in other countries, the SBGF and the CBGF had fairly wide mandates, meaning they were entrusted with a wider array of intervention methods. In addition to paying out depositors of failed banks, the funds were enabled to participate in financing acquisitions of failed banks, allocate capital directly to member banks' balance sheets and guarantee member banks' loan portfolios. Although both funds were privately owned (by the banks), both the supervisory authority BISC and Norges Bank were represented on their boards (Wilse, 2004).

The SBGF and the CBGF intervened several times during the crisis' first years. Upon the diagnosis of the BISC, the funds provided guarantees for Norges Bank's liquidity loans, issued guarantees for banks' commitments and appointed new boards to work on long-term solutions (i.e. mergers). The CBGF also announced that they might issue preference capital, and the SBGF took on losses in several cases in order to facilitate for mergers between savings banks (Wilse, 2004). All these interventions tore out the funds' capital, which were effectively depleted by the end of 1990. The government understood it had to enter the stage, and employed several measures to avoid a further deepening of the banking crisis (Steigum, 1992).

4.4.3 Government support

The principal measure undertaken by the government was the establishment of two government funds. In addition to that, the central bank started granting loans at interest rates below market rates. Also, the annual premium paid by the banks to the guarantee funds was lowered to 25 % of its original level. Furthermore, the Storting issued a grant to the SBGF to support their operations (Wilse, 2004).

As mentioned, the government established two funds, the first of which was the Government Bank Insurance Fund (GBIF) in March 1991. In doing so, the government hoped to restore faith in the banking sector and make sure both savings and commercial banks were able to keep up their normal operations; providing credit to the Norwegian society and thus spur economic growth. The fund was granted an initial amount of NOK 5bn. As the SBGF and the

CBGF had done a fine job in keeping the Norwegian banking sector afloat throughout 1990, the GBIF's mandate was not to support banks directly, but rather to benefit from the system already in place and thereby support the two guarantee funds. However, the GBIF was granted the power to impose conditions on both the funds and the banks ultimately receiving government aid. An important point is the swap of two bank representatives with government representatives on the boards of both the SBGF and the CBGF. Given the pre-established presence of representatives from the BISC and Norges Bank, the guarantee funds were effectively run by the authorities. As for the aid, this was given in the form of support loans to the guarantee funds, which in turn supplied risk capital to the different banks (Wilse, 2004).

During the fall of 1991, two large commercial banks announced negative first half results, and applied for preference capital from the CBGF due to their deteriorating situations. As the guarantee fund had next to no available capital, the capital infusions were by and large financed by support loans from the GBIF at a total amount of NOK 2450m. Two medium-sized regional savings banks incurred similar fates as the above-mentioned commercial banks, and applied to the SBGF to cover their negative equity. As did its counterpart for the commercial banks, the Savings Banks' Guarantee Fund financed the capital injections through support loans of NOK 320m from the GBIF. Consequently, the Insurance Fund was stripped of half its resources as early as October 1991. This immediately led to further government action, as the following was proposed to the Storting and eventually approved on November 29, 1991:

-   A further allocation of NOK 6bn to the Government Bank Insurance Fund, as well as added instruments
-   Creation of the Government Bank Investment Fund (SBIF[10]) with initial capital of NOK 4.5bn
-   Subsidized deposits from Norges Bank
-   Further reduced premium payments to the CBGF and the SBGF
-   A grant of NOK 1bn to the Savings Banks Guarantee Fund
-   Reduced liquidity requirements for banks

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[10] I use the Norwegian acronym (Statens Bankinvesteringsfond – SBIF) in order to distinguish from the Government Bank Insurance Fund.

The perhaps most important of these measures was the creation of the SBIF, whose objective was to infuse capital into Norwegian banks on normal market conditions. The fund was mandated to participate in banks' issues of capital instruments alongside private investors. The banks had had trouble raising capital in the market due to the uncertainty regarding the entire sector, and the aim of the SBIF was thus to restore investor confidence. At the same time, the GBIF was permitted to invest directly in bank shares or primary capital certificates in cases where the banks were otherwise not capable of raising funds. Christiania Bank and Fokus Bank, two big commercial banks, lost all their equity and were once again in need of substantial capital infusions towards the end of 1991. Capital from GBIF ensured that Christiania Bank and Den Norske Bank attained a capital adequacy ratio of 8 % at year end, whereas the authorities approved of a corresponding ratio of 5.5 % at Fokus Bank, given their plans to sell off substantial assets. This led to GBIF being the sole owner of Christiania Bank and Fokus Bank, whereas SBIF became the majority owner of Den Norske Bank after an issue of preference shares during spring 1992 (Wilse, 2004). Why this focus on capital adequacy ratios? If the authorities are the ones both injecting capital and supervising capital levels, why was it so important to always make sure the year end ratios were in line with requirements? An important reason was the substantial share of foreign capital that funded Norwegian banks (Wilse, 2004). In order to avoid foreign capital withdrawals, keeping the capital adequacy ratios at sound levels was a crucial exercise.

One would maybe think that all this injected capital would suffice, but as the end of 1992 approached, it was once again evident that fresh capital was needed. The three largest commercial banks were going to see deficits for the full year, and their capital ratios would not exceed the minimum required level at year end without further infusions. The GBIF had little capital left, and thus the Storting was once again asked to adopt new legislation and dutifully did so. The GBIF was endowed with another NOK 4bn which was directly injected into the three commercial banks. Even though the commercial banks needed the largest amounts, there were also savings banks in precarious need of capital at this point. The SBIF participated in issues of subordinated debt by three savings banks in 1992 (Union Bank of Norway, Sparebanken Vest and Sparebanken Møre), reaching a total participation of NOK 1bn (Wilse, 2004).

Altogether, the capital provided by the GBIF amounted to NOK 16.2bn, of which NOK 554m were provided to savings banks through the SBGF. In other words, the banking crisis was

somewhat harder on the commercial banks than on the savings banks, but including the support financed by the SBGF itself, a total of 17 savings banks were supported. The government capital was not infused without conditions, though. The receiving commercial and savings banks had to agree to cost and balance sheet cuts as well as see board representatives and executive management being replaced (Wilse, 2004). However, apart from bolstering banks' capital adequacy ratios and keeping some banks from bankruptcy, did the capital infused by the authorities increase credit growth?

4.4.4 Consequences of government interventions

As mentioned in relation to the description of my problem statement, research has been done on whether the state support led to dissimilar developments between supported and non-supported banks. As the support was significantly skewed towards certain banks, the analysis done by Norges Bank and referred to in Sandal (2004) is looking at the developments in the two largest commercial banks as compared to all other Norwegian banks. Figures 3 and 4 below show the development in annual lending growth and capital adequacy ratios from 1991 to 2002. The annual lending growth is stronger among the other banks in 1992 and 1993 at the time of Den Norske Bank's and Christiania Bank's deepest struggle, whereas they more or less follow the same pattern from 1995. The capital adequacy ratio follows a fairly similar pattern for all banks, although the other banks are at a significantly higher level. This is probably due to several factors, since for example different funding methods lead to needs for different capital levels. There is reason to believe that the development in lending growth would have been more severe in Den Norske Bank and Christiania Bank, along with the other supported banks, if less capital were infused.

4.5 Government interventions in previous crises

To sum up, it is clear that previous banking crises in Norway have taken their toll on the Norwegian banking sector. Banks have gone bankrupt or been wound down, with or without government assistance, and a lot of capital has been lent or infused in different manners at different times. Also, even though the crisis around 1900 was significantly harder on commercial banks (especially in the Oslo area) than on savings banks, both types of banks were severely affected during the 1920s and the early 1990s. Section 11 makes a further comparison of government support during Norwegian banking crises, also taking the financial crisis of 2007-2009 into account.

Figure 3: Annual growth in lending 1991-2001 (%).
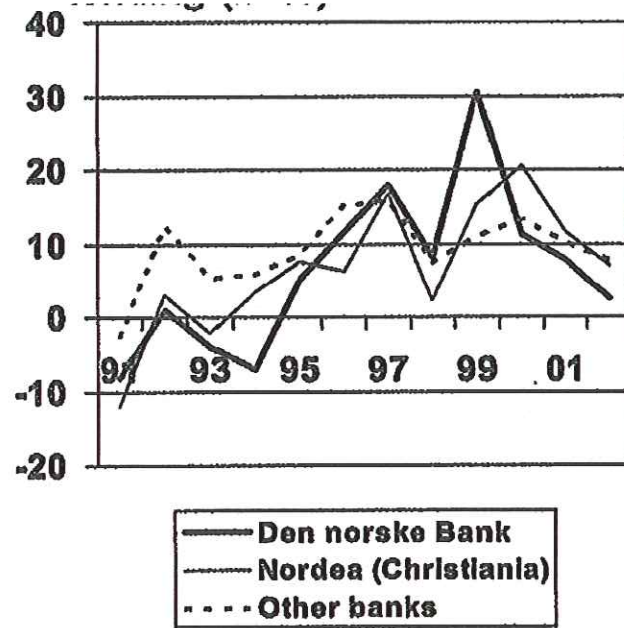
Figure 4: Capital adequacy ratios 1991-2001 (%).
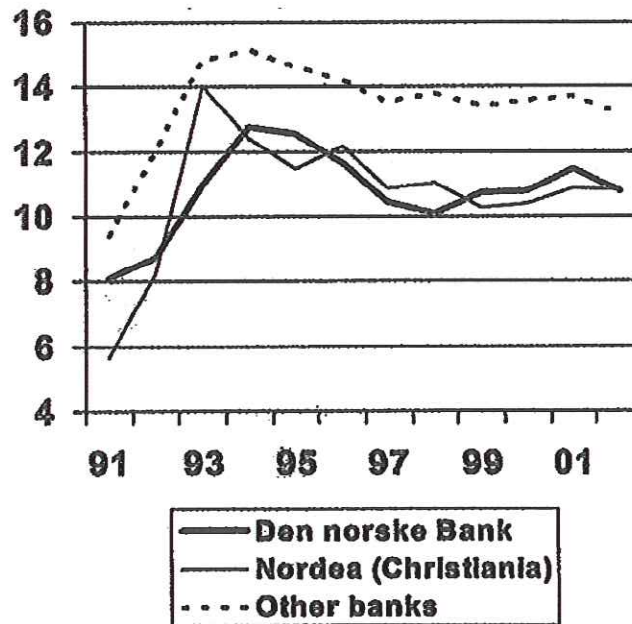
5 The financial crisis of 2007-2009 and the Norwegian economy

This section will first provide a description of how the Norwegian economy was affected by the most recent financial crisis and how the government reacted, before going more into detail on the specific government support measure examined in this thesis; the Norwegian State Finance Fund.

5.1 How was the Norwegian economy affected?

The international financial crisis can be said to have originated in the American market for subprime loans in 2007. Assuming that the readers of this thesis are familiar with the features of this particular crisis, this section will not provide a detailed explanation of the chain of events leading up to it. The focus will instead be on how the crisis affected the Norwegian economy.

The Norwegian economy was in a good shape prior to the crisis in 2007. The Norwegian state finances were solid, and the economy had seen an upturn particularly since 2003 (Commission on the Financial Crisis, 2011). This was partly due to the successful implementation of inflation-targeted monetary policy and a sound fiscal policy-rule, as well as a competent system of macro-prudential supervision (Steigum, 2010). Increased immigration of workers caused further increase in utilization of industry capacity, and an incline in international demand for Norwegian export goods spurred growth among exporters. However, such high activity and employment did eventually lead to higher wage levels compared to our trading partners (Commission on the Financial Crisis, 2011).

Norges Bank increased the interest rate in order for the economy not to overheat. Thus in 2007 and early 2008, higher interest rate levels[11] caused a fall in industry investments as well as individual real estate investments and household consumption. At the same time, international demand fell and caused a starting decline in exports. As a result, the upturn in the Norwegian economy was already calming when the international financial crisis started to take its toll in the fall of 2008 (Commission on the Financial Crisis, 2011).

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[11] Norges Bank's key policy rate was 5.75 % at its highest.

The Norwegian banking sector is dependent on access to international liquidity. Norwegian banks, especially the larger ones, are funding credit to Norwegian households and firms partly by borrowing in international markets. Therefore, the international financial crisis of 2007-2009 affected the Norwegian banking sector mainly in three ways. (1) Liquidity issues and thus soaring interbank market rates internationally made it difficult for Norwegian banks to obtain the necessary access to liquidity, (2) a deterioration of market conditions worldwide led to a decline in the value of the banks' securities portfolios and (3) the low growth internationally would lead to losses on loans and a consequential deteriorating solvency position for Norwegian banks (Norwegian State Finance Fund, 2009).

Consequently, as the international capital markets dried up during the fall of 2008, the Norwegian banking sector was in need of liquidity in order to service their commitments[12].

5.2 Government support

According to the Norwegian Commission on the Financial Crisis, who published its report "Bedre rustet mot finanskriser" (Commission on the Financial Crisis, 2011) in January, 2011, the Norwegian economy has made it quite well through the crisis. This was partly due to structural reasons like a well-implemented social safety net and a production sector producing goods still in demand during a crisis (unlike for instance cars). Additionally, the demand for oil and gas stayed at healthy levels. Still, measures had to be taken in the fall of 2008. Norges Bank swiftly lowered the key policy rate, reaching 1.25 % already in June 2009, and the government implemented an expansive fiscal policy (Commission on the Financial Crisis, 2011).

These facts notwithstanding, the Norwegian authorities were forced to respond to the demand from the financial sector. There were in essence two issues of importance; a liquidity problem and a potential solvency problem. Norges Bank started out by promptly giving the banks easier access to loans with 2 and 3 years maturity, whereas the Storting voted to establish the exchange arrangement for covered bonds, so that banks could exchange their covered bonds into more liquid government bonds (Norwegian State Finance Fund, 2009). Additionally, the Government Bond Fund was established in February, 2009, to improve liquidity conditions

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[12]However, since many Norwegian banks fund a large share of their loans by deposits made by Norwegian citizens, the effect of the international liquidity situation could have been much worse (Commission on the Financial Crisis, 2011).

and invest capital primarily in the Norwegian credit bond market on commercial terms alongside other investors (Folketrygdfondet). 15 financial institutions received capital from the Government Bond Fund during 2009, among which nine were savings banks (Folketrygdfondet, 2009).

As for the solvency issue, there were in effect two solutions for the banks; (1) reduce the total assets through a tightening of lending policy or (2) increase the amount of Tier 1 capital. Since a reduction in credit growth would accommodate an already slowing economy, it was highly undesirable for the government that the banks choose option (1). Therefore, the State Finance Fund was established in February 2009 (Norwegian State Finance Fund, 2009).

5.3 The Norwegian State Finance Fund

This section will describe the organization and mandate of the Norwegian State Finance Fund, as well as the conditions tied to the fund's capital. The clear objective of the SFF was to infuse equity and hybrid capital into the banks in order to bolster their Tier 1 capital ratios and spur credit growth (Norwegian State Finance Fund, 2009).

5.3.1 Mandate

The SFF was established through a proper legal proposition, and was given a total capital of NOK 50bn to allocate to the Norwegian banking sector. § 1 in the Law on the State Finance Fund states that the purpose of the fund is "… to contribute temporarily with core capital to Norwegian banks in order to strengthen the banks and render them more capable of maintaining normal lending business."[13] (author's translation) (Norwegian Law on the State Finance Fund, 2009).

Moreover, the creation of the State Finance Fund needed approval from the EFTA Surveillance Authority (ESA) given the SFF's status as a measure of government support. In addition to the constraint that support only could be given to financially solvent banks, the ESA was particularly interested in three features of the SFF support; (1) that the price of the capital instrument was determined by a risk-free interest rate plus a markup dependent on

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[13] Author's translation. The Norwegian text reads as follows: "Statens finansfond (Finansfondet) har til formål å bidra midlertidig med kjernekapital til norske banker for å styrke bankene og sette bankene bedre i stand til å opprettholde normal utlånsvirksomhet. " (Norwegian Law on the State Finance Fund, 2009)

each bank's risk profile and type of instrument, (2) that the support arrangement included economic incentives to pay back over time, as for instance increasing interest rates, and (3) that the arrangement incorporated mechanisms to counteract biased competition.

In their decision, the ESA states the following:

«The Norwegian authorities have explained that only banks that are fundamentally sound are eligible to participate in the notified scheme. On the basis of the information provided by the banks when applying for the capital injection and on the basis of objective criteria (formal capital adequacy ratios, analysis of each bank's various risk exposures, asset quality, business prospects, etc.), the Norwegian Financial Supervisory Authority will exercise a «gate-keeping» function and assess whether a bank is fundamentally sound.» (Norwegian State Finance Fund, 2009) In addition, the SFF adheres to requirements for state aid in the European Economic Area (EEA) agreement as well as being designed to meet European Central Bank (ECB) recommendations regarding price structure (Norwegian State Finance Fund).

Furthermore, the mandate allows the SFF to allocate capital through two types of capital instruments; hybrid capital ("fondsobligasjoner") and preference capital ("preferansekapital").

5.3.2 Capital instruments

The hybrid capital instrument has a perpetual maturity, and is treated from a regulatory perspective as hybrid Tier 1 capital. In terms of loss-absorbing capacity, the hybrid capital is senior to contributed share capital and contributed Primary Capital Certificates (PCC)/Equity Certificates (EC) as well as the Savings Banks' Reserve, the Gift Fund and preferred capital. This instrument is pari passu with other Tier 1 securities, but junior to all other debt. With regards to coupon payments, this security's coupon is initially based on the Norwegian Government bond rate, plus a premium of 5-6 percentage points, depending on the risk class assigned to each bank by the FSA. In order to incentivize for redemption, the premium is raised by one percentage point after four years and another percentage point after five years. The coupon shall be paid only insofar as the bank's profits allow and only if the bank does not, after paying the coupon, have a Tier 1 capital ratio or a total regulatory capital ratio less than 0.2 percentage points above the minimum requirement. The hybrid capital is redeemable at any time upon the issuing bank's decision, only subject to approval from the FSA.

The preference capital is also perpetual, but contrary to the hybrid capital it is treated as core Tier 1 capital from a regulatory point of view. Consequently, its loss-absorbing capacity is equal to contributed share and PCC/EC capital, and it is junior in ranking to all other Tier 1 securities. There is no coupon payment, but dividend is calculated based on the Norwegian Government bond rate plus a premium of 6-7 percentage points, depending on the assigned risk class. As with the hybrid capital coupon, dividend shall be paid only insofar as the bank's profits allow (after coupon payments) and only if the bank does not, after paying the dividend, have a Tier 1 capital ratio or a total regulatory capital ratio less than 0.2 %-points above the minimum requirement.

The perhaps most specific feature of the preference capital is the automatic conversion into ordinary shares after five years, or earlier (optional for the SFF) if the instrument represents more than 50 % of book equity or if its proportion of book equity has increased more than 33 % since launch. Also, the preference capital is only redeemable after three years, subject to FSA approval (Norwegian State Finance Fund). Almost all banks chose hybrid capital over preference capital (see section 5.3.4).

5.3.3 Conditions for capital

A number of conditions followed the acceptance of SFF funding. Put differently, the government was neither intending to lose money nor to give funding without imposing quite harsh restrictions on executive pay and dividend payments. Among some of the conditions imposed were the requirement to freeze salaries and other benefits for executives until December 31st, 2010, to keep fixed salary and bonus at a maximum of NOK 1.5 million per executive in 2009 and 2010 and to abstain from paying the shareholders dividend of more than 50 % of the bank's free equity.

Moreover, the capital was allocated after a rather rigorous process, in which the SFF considered each bank's need for capital according to the following five criteria:

1. The need for capital calculated by the bank's own Internal Capital Adequacy Assessment Process (ICAAP[14]) compared to the bank's budgeted Tier 1 capital in the 2009-2011 period
2. The FSA's assessment of the bank's ICAAP
3. The bank's Tier 1 capital compared to average Tier 1 capital for banks with similar levels of total assets
4. Credit assessments of the bank conducted by official credit rating agencies or other market players
5. The bank's Tier 1 capital by the end of 2011 according to the SFF's stress test scenario, compared to the regulatory minimum of 4 %

Raising the lending growth rate was the explicitly stated main objective for the SFF. However, the fund set an upper limit for lending growth financed by their capital: Planned lending growth financed by SFF capital could not exceed 10 %. Additionally, specific documentation was required for banks applying for capital that would raise their Tier 1 ratio above 12 % or by more than 2 pp (Norwegian State Finance Fund, 2009). Table 1 shows that the former was the case for 18 banks, and the latter for four banks.

5.3.4 Allocation of capital

The fund received 34 applications with a total value of NOK 6.8bn. Six of these banks withdrew their applications. Of the remaining 28, 27 were savings banks. The fund eventually allocated NOK 4 133.8 million (see Table 1), of which 27 million was preference capital (requested by one bank only) and the rest was hybrid capital. A total of NOK 3 933.8 million was allocated to the 27 different savings banks (Norwegian State Finance Fund, 2009).

5.3.5 Organization

The SFF was in 2009 governed by a board consisting of lawyer and chairman Endre Skjørestad[15], lawyer and vice chairwoman Bjørg Ven and professor and board member Thore Johnsen. The fund engaged Wikborg Rein as judicial advisor and Pareto Securities and UBS as financial advisors after a tender process during spring 2009. Every bank applying to the

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[14] The result from which is regularly reported to the FSA.
[15] Skjørestad resigned from his position on April 15th 2010. Ven assumed the position as chairwoman, while Bjørn Arild Gram was appointed new vice chairman. There were no further changes (Norwegian State Finance Fund, 2010).

Table 1: Capital allocated to Norwegian banks from the Norwegian State Finance Fund.

Bank	Innskudd Mill kr.	Risiko- klasse	Forvaltnings- kapital Mill kr	Kjernekapital- dekning før innskudd	Anslått kjernekapital- dekning etter innskudd	Anslått økning i kjernekapital- dekning. Prosentpoeng
Aurskog Sparebank	60,0	3	6 214	12,39 %	14,33 %	1,94 %
Bamble og Lange- sund Sparebank	30,0	3	3 130	10,19 %	11,90 %	1,71 %
Blaker Sparebank	20,0	3	2 257	11,96 %	13,78 %	1,82 %
Bud, Fræna og Hustad Sparebank	25,0	3	2 307	13,72 %	15,69 %	1,97 %
Gjerstad Sparebank	18,0	3	1 390	9,73 %	11,99 %	2,26 %
Grong Sparebank	22,0	3	1 912	12,85 %	14,84 %	1,99 %
Hjelmeland Sparebank	30,5	3	2 503	10,09 %	12,09 %	2,00 %
Hol Sparebank	25,0	3	2 338	12,26 %	14,18 %	1,92 %
Holla og Lunde Sparebank	41,0	3	3 992	13,62 %	15,61 %	1,99 %
Indre Sogn Sparebank	33,0	3	3 144	12,52 %	14,51 %	1,99 %
Klepp Sparebank	75,0	3	6 290	10,80 %	12,73 %	1,93 %
Kvinesdal Sparebank	31,5	3	2 646	11,10 %	13,10 %	2,00 %
Lillestrøm Sparebank	60,0	3	6 129	8,77 %	10,62 %	1,85 %
Iles Prestegjelds Sparebank	96,8	3	5 252	8,64 %	11,62 %	2,98 %
Rørosbanken	40,0	3	3 769	13,41 %	15,38 %	1,97 %
Sandnes Sparebank	450,0	3	28 429	8,90 %	11,07 %	2,17 %
Selbu Sparebank	28,0	3	2 483	14,36 %	16,31 %	1,95 %
Seljord Sparebank	20,0	3	1 680	12,12 %	14,05 %	1,93 %
Soknedal Sparebank	13,0	3	1 223	14,64 %	16,57 %	1,93 %
SpareBank 1 Buskerud-Vestfold	200,0	3	21 508	10,31 %	11,92 %	1,61 %
Sparebank 1 SMN	1 250,0	2	89 716	8,58 %	10,70 %	2,12 %
Sparebanken Sør	400,0	2	35 406	10,82 %	12,82 %	2,00 %
Sparebanken Vest	960,0	2	92 499	8,52 %	10,51 %	1,99 %
Tinn Sparebank	25,0	3	2 398	12,79 %	14,74 %	1,95 %
Totens Sparebank	132,0	3	11 985	9,81 %	11,81 %	2,00 %
Vegårshei Sparebank	9,0	3	823	12,33 %	14,33 %	2,00 %
Verdibanken ASA	15,0	3	1 528	10,24 %	11,98 %	1,74 %
Ørland Sparebank	24,0	3	2 345	15,92 %	17,89 %	1,97 %
Sum/FVK veid gjennomsnitt	4 133,8		345 296	9,51 %	11,54 %	2,03 %

Note: The table shows (from left to right) capital allocated (MNOK), risk class, total assets (MNOK), pre-support Tier 1 ratio (%), estimated post-support Tier 1 ratio (%) and estimated increase in Tier 1 ratio (percentage points). Verdibanken ASA is a commercial bank. Source: The Norwegian State Finance Fund (Annual report, 2009).

fund would first have its solvency and risk exposure measured by the FSA, before having its application considered by the board. The board would then make the decision in all cases, but would present in writing especially important cases for the Ministry of Finance (Norwegian State Finance Fund, 2009).

6 Data

The data used are downloaded from the website of the Norwegian Savings Banks Association, where compiled, but not aggregated annual data from all savings banks are published[16] (Norwegian Savings Banks Association). In order to isolate the effect of the support from the State Finance Fund only, I have eliminated all banks that received capital support from the Government Bond Fund exclusively, as well as those receiving support from both funds.

In addition, banks that have been subject to mergers or acquisitions are taken out of the dataset according to the following rule. If a big bank has acquired a small bank whose average total assets[17] (ATA) do not correspond to more than 5 % of the big bank's, the small bank is taken out of the sample throughout the time series, whereas the big bank is kept (the small bank's influence on the figures is considered insignificant). If this is not the case, all banks involved in the merger or acquisition are taken out of the sample[18].

Consequently, the final sample consists of 100 savings banks for which time series data are consistent and comparable, and whose numbers are not confounded by support from the Government Bond Fund. 23 of these received capital support from the State Finance Fund, whereas the remaining 77 did not.

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[16] I have verified that the numbers in the spread sheets for 2007, 2008, 2009 and 2010 refer to the exact same variables, so that it makes sense to look at evolution within each variable. Furthermore, I have assigned a Bank ID (BID) to each savings bank using the ranking (by average total assets) from the 2010 data.

[17] Average total assets for a certain year is the average of a bank's total assets at the end of the previous year and the actual year.

[18] Vestfold Sparebank and Sparebank 1 Kongsberg merged in 2008, and became Sparebank 1 Buskerud-Vestfold. These two banks were quite similar in size, and are eliminated from the sample altogether. The same is the case of Sparebanken Telemark and Sparebanken Grenland who merged in 2008 to become Sparebank 1 Telemark. Sparebanken Vest acquired Sauda Sparebank in 2009, whose ATA in 2008 corresponded to 1.4 % of Sparebanken Vest's. Similarly, Sparebanken Møre acquired Tingvoll Sparebank in 2009, whose ATA in 2008 corresponded to 2.7% of Sparebanken Møre's. I consider the influence of the acquired banks on the acquirers as insignificant, and thus keep Sparebanken Vest and Sparebanken Møre in the sample, whereas the two small banks are taken out. Moreover, Sparebank 1 SR-Bank acquired Kvinnherad Sparebank in 2010, whose ATA for 2009 equaled 2.8 % of Sparebank 1 SR-Bank's. The same was the case for Sparebanken Sogn & Fjordane's acquisition of Fjaler Sparebank, whose 2009 ATA equaled 4.4 % of the former's. Kvinnherad and Fjaler are thus taken out of the sample. Høland Sparebank merged with Setskog Sparebank in 2010, but as Setskog's ATA for 2009 equaled 14 % of Høland's, both are eliminated from the sample. As for the merger of Sparebank 1 Ringerike, Sparebank 1 Jevnaker Lunner and Sparebank 1 Gran, the former is not that much larger than the two latter, and hence they are all eliminated.

Eliminated entity	Reason
Bien Sparebank	Received capital from Government Bond Fund (GBF)
DnB Nor Bank	Received capital from Government Bond Fund
Rygge-Vaaler Sparebank	Received capital from Government Bond Fund
Sparebank 1 Nord-Norge	Received capital from Government Bond Fund
Sparebank 1 SR-Bank	Received capital from Government Bond Fund
Sparebanken Narvik	Received capital from Government Bond Fund
Sparebanken Sogn & Fjordane	Received capital from Government Bond Fund
Hjelmeland Sparebank	Received capital from the SFF and the GBF
Klepp Sparebank	Received capital from the SFF and the GBF
Sandnes Sparebank	Received capital from the SFF and the GBF
Sparebanken Grenland	Merged with Sparebanken Telemark, 2008
Sparebanken Telemark	Merged with Sparebanken Grenland, 2008
Sparebank 1 Telemark	Merged entity
Sparebank 1 Kongsberg	Merged with Vestfold Sparebank, 2008
Vestfold Sparebank	Merged with Sparebank 1 Kongsberg, 2008
Sparebank 1 Buskerud-Vestfold	Merged entity
Sauda Sparebank	Acquired by Sparebanken Vest, 2009
Tingvoll Sparebank	Acquired by Sparebanken Møre, 2009
Fjaler Sparebank	Acquired by Sparebanken Sogn & Fjordane, 2010
Kvinnherad Sparebank	Acquired by Sparebank 1 SR-Bank, 2010
Høland Sparebank	Merged with Setskog Sparebank, 2010
Setskog Sparebank	Merged with Høland Sparebank, 2010
Sparebank 1 Gran	Merged with Sparebank 1 Ringerike and Sparebank 1 Jevnaker Lunner, 2010
Sparebank 1 Jevnaker Lunner	Merged with Sparebank 1 Ringerike and Sparebank 1 Gran, 2010
Sparebank 1 Ringerike	Merged with Sparebank 1 Jevnaker Lunner and Sparebank 1 Gran, 2010

Note: This table shows banks excluded from the sample due to mergers, acquisitions or balance sheet size.

Analysis – Part I

7 Descriptive statistics

I will in this section use balance sheet data, key performance indicators and other characteristics to describe the differences between the group of savings banks that applied for, and received, government support (Supported Banks – SB) and the remaining savings banks (Other Banks – OB). Firstly, I will look at the market structure of the Norwegian loan and deposit markets as well as give an overview of the supported banks. Secondly, I will describe recent developments in regulatory capital ratios, lending growth rates, funding structure, write-downs, deposit/loan ratios, growth in customer deposits, profitability and cost/income ratios. Lastly, I will look at whether there might be a geographical pattern to which banks applied for government support and which ones did not.

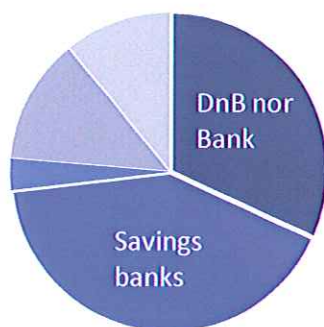**Figure 5a: Market shares of gross retail loans.**

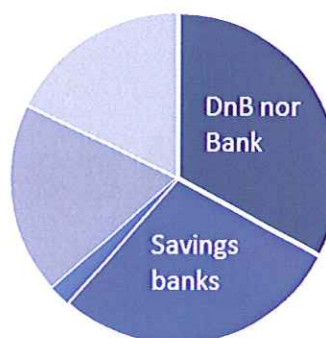**Figure 5b: Market shares of gross commercial loans**

Figure 5c: Market shares of retail deposits

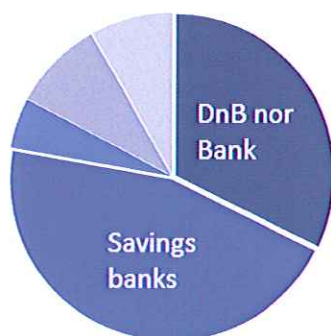

Figure 5d: Market shares of commercial deposits
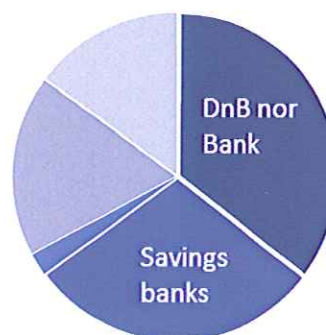
- ■ DnB Nor Bank
- ■ Savings banks
- ■ Other commercial banks
- ■ Subsidiaries of foreign banks
- ■ Branches of foreign banks

Note: Figures as of September 30, 2010. Source: Norges Bank

7.1 Market structure

As shown by Figure 5, the Norwegian markets for loans and deposits are dominated by DnB nor Bank. However, the savings banks (DnB nor Bank excluded) claim a large chunk of each of these markets. When it comes to gross retail loans and retail deposits (figures 5a and 5c, respectively), they are in sum bigger than any other bank or group of banks. Their shares of commercial loans and deposits are second to DnB nor's, but larger than those of other commercial banks and subsidiaries and branches of foreign banks in Norway. This gives a picture of the importance of the Norwegian savings banks sector for the continued progress and prosperity of the Norwegian economy. The savings banks are essential in providing credit to a majority of households and a substantial share of firms, something the government perceived when establishing the Norwegian State Finance Fund in 2009.

7.2 The supported banks

27 savings banks received hybrid capital or preference capital from the SFF in late 2009 (Figure 6), of which only 23 will be part of my analysis as a result of received capital from the Government Bond Fund as well as mergers and acquisitions (see section 6). After Figure 6, all banks mentioned in Table 2, section 6 are excluded from all following figures, unless otherwise specified.

As shown by Figure 6, the distribution of capital was quite uneven due to the banks' various sizes. Of the NOK 4.1bn allocated, about 3bn was given to the four largest of these banks; Sparebank1 SMN, Sparebanken Vest, Sandnes Sparebank and Sparebanken Sør.

Figure 6: Supported banks and allocated amounts of capital in 2009 (MNOK).
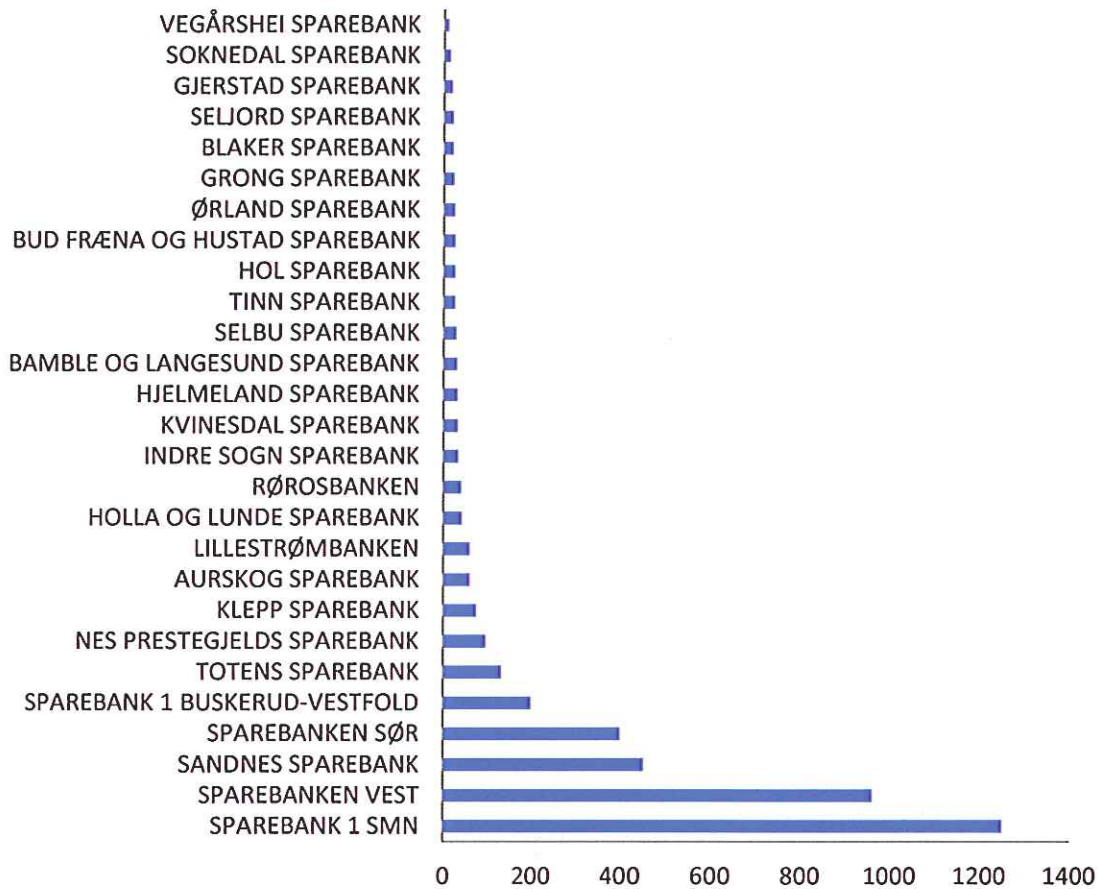
7.3 Regulatory capital ratios

The distribution of capital might have been uneven in absolute numbers, but it was much more even relative to each bank's risk-weighted assets. Each of the banks had their Tier 1 capital ratio raised by between 1.61 and 2.98 percentage points and ended up with an estimated ratio in the range from 10.51 % to 17.89 % (see Table 1) (Norwegian State Finance Fund, 2009).

As shown in Figure 7, the supported savings banks did on average have a substantially lower capital adequacy ratio than the remaining savings banks prior to the SFF infusions. The capital from SFF obviously had an immediate effect on these ratios, since the hybrid and preference capital instruments allocated to all the supported savings banks had

Figure 7: Average Tier 1 ratios (Tier 1 capital in per cent of RWA).
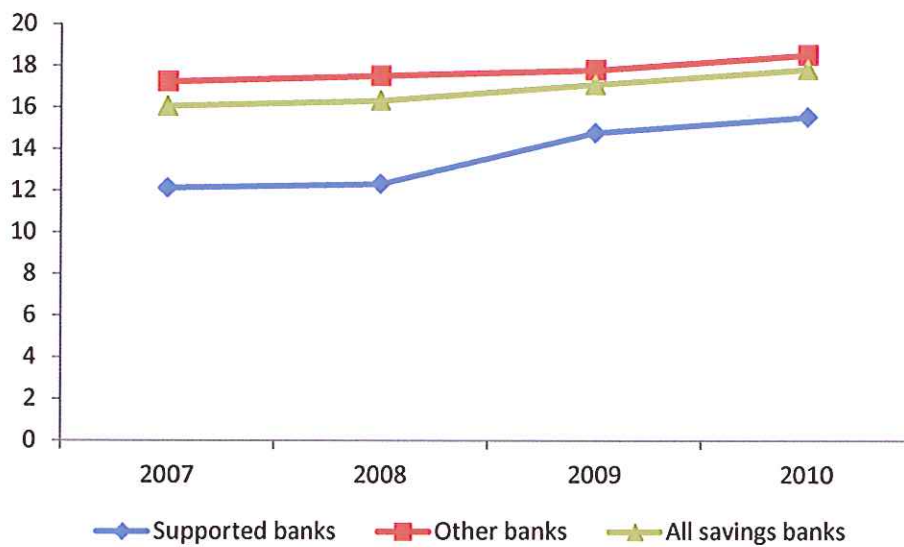
the regulatory features of Tier 1 capital. This bolstered these banks' Tier 1 ratios as well as total regulatory capital ratios (including Tier 2 capital), and brought the supported banks up to an average Tier 1 ratio of 14.8 % at year end 2009, which is still below, but much closer to the rest of the savings banks. It is beyond doubt that the SFF capital improved the solvency of the savings banks in question. As for 2010, the development has been fairly similar for both groups of banks.

On a historical note, it might be worthwhile taking a look at the average Tier 1 ratio of Norwegian savings banks for the period 1995-2010 (Figure 8). At the start of the banking crisis in 1989-90, one has shown that the Tier 1 ratios of the Norwegian banks were rather low due to a loose supervisory regime and little experience with risk exposure (Vale, 2004). This seems to have been corrected in the aftermath of the banking crisis as evidenced by the average figure of about 20 %. However, there was a clear tendency in the late 1990s of declining capital ratios to the detriment of solvency, before they more or less stabilized until we see the increase mentioned for 2009. Still in 2010, the average level is several percentage points below that of 1995. This might be a reflection of several things, but one possible explanation is a less risk-averse banking culture today compared to 1995, when the sector had recently been through a deep crisis.

Figure 8: Average Tier 1 ratio for all Norwegian savings banks 1995-2010.
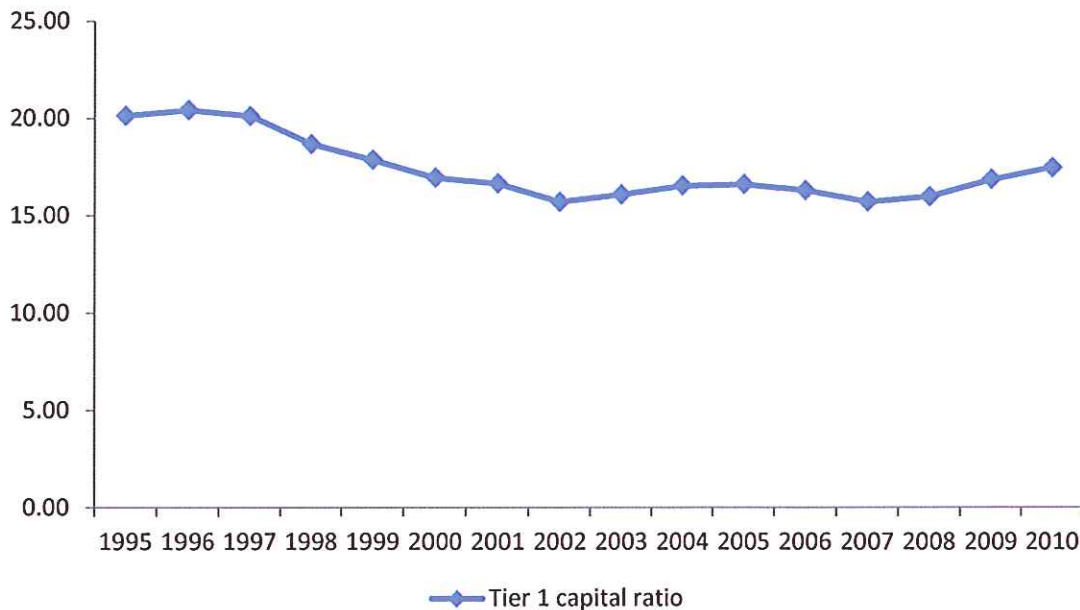
Note: Average Tier 1 ratio for all Norwegian savings banks 1995-2010. This figure includes all existing savings banks each year.

7.4 Lending growth

Since this thesis is principally looking at the development in lending growth for Norwegian savings banks under and after the financial crisis, Figure 9 is particularly interesting as it shows the average net lending growth rates for the savings banks in the sample from 2007-2010, as well as the growth rates forecasted by the SFF. The net lending growth is weighted using gross loans as weights. Figure 9 clearly shows that there was a difference in credit growth between the group of supported savings banks and the other savings banks prior to the capital infusions. Comparing the blue curve for the supported banks with the red curve for the other banks reveals a pronounced steeper decline in growth rates for the supported banks from 2007-2009. They enjoyed markedly higher credit growth in 2007, but subsequently plunged to a negative rate in 2009. This suggests a pattern as to which banks applied for government support from the SFF; application for support might have been triggered partly by rapidly declining lending growth rates as a consequence of low capital levels.

In their annual report for 2009, the SFF forecasted the development in lending growth for the supported banks as opposed to the counterfactual (based on planned lending growth among banks).

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Figure 9: Weighted average of net lending growth with forecasts. Gross loans as weights.
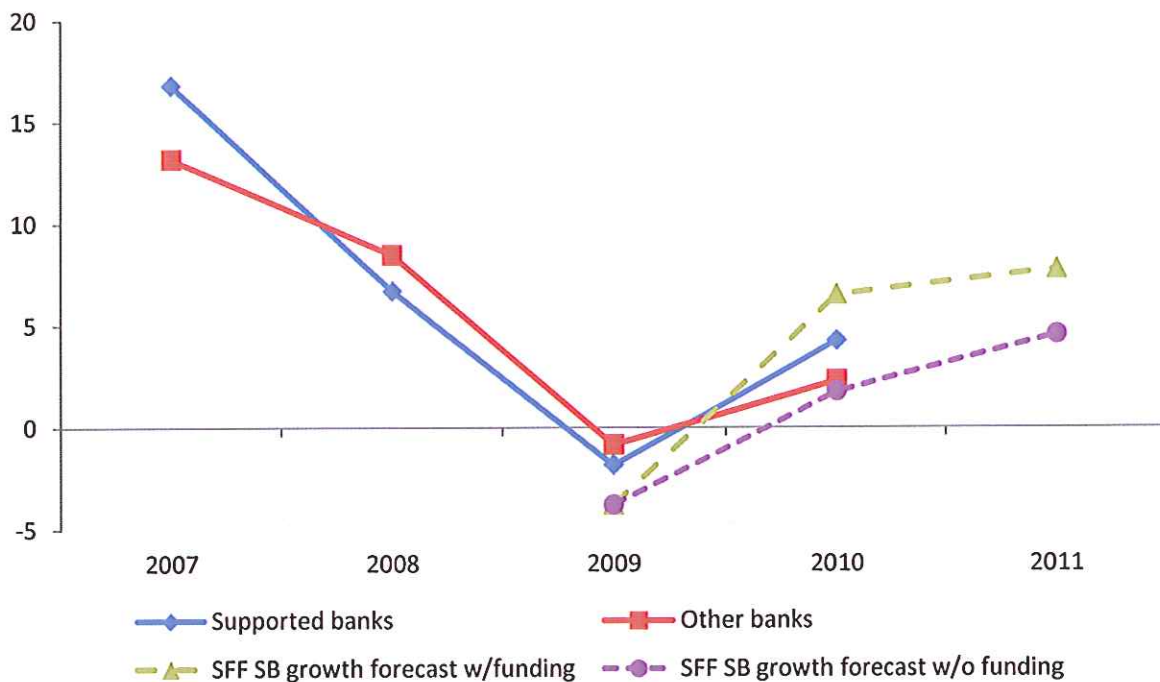
Note: The dashed green line is the SFF's forecast for the supported banks with additional capital, whereas the dotted purple line is the corresponding counterfactual scenario. The difference in 2009 values between the SFF forecast and my calculation is due to my sample containing fewer banks (see section 6).

As Figure 9 shows, the SFF expected the supported banks to attain rates of 6.52 % and 7.77 % for 2010 and 2011, respectively (dashed green line), whereas they would have had to cope with rates of 1.77 % and 4.57% in the case of no support (dotted purple line)[19]. However, the actual numbers show a weighted average (by gross loans) of the net lending growth rate of only 4.26 % for the supported banks. The other banks attain correspondingly a net lending growth rate of 2.30 %, which means their development from 2009 is beaten by that of the supported banks. In other words, it might seem like the SFF capital infusions were transformed into an increased credit supply on average. However, just by looking at the graph we cannot directly conclude that the supported banks' superior development is due to the capital infusions made by the SFF, as there might be other explanations as well. The effect on capital adequacy ratios naturally occurs immediately, as we have seen, but the potential effect on credit growth seems to materialize first in 2010. This development will be analyzed by use of econometric methods in section 10.

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[19] The SFF forecasts are based on banks' reported planned lending growth in the cases of government support or not.

Figure 10: Average annual net lending growth for Norwegian savings banks.
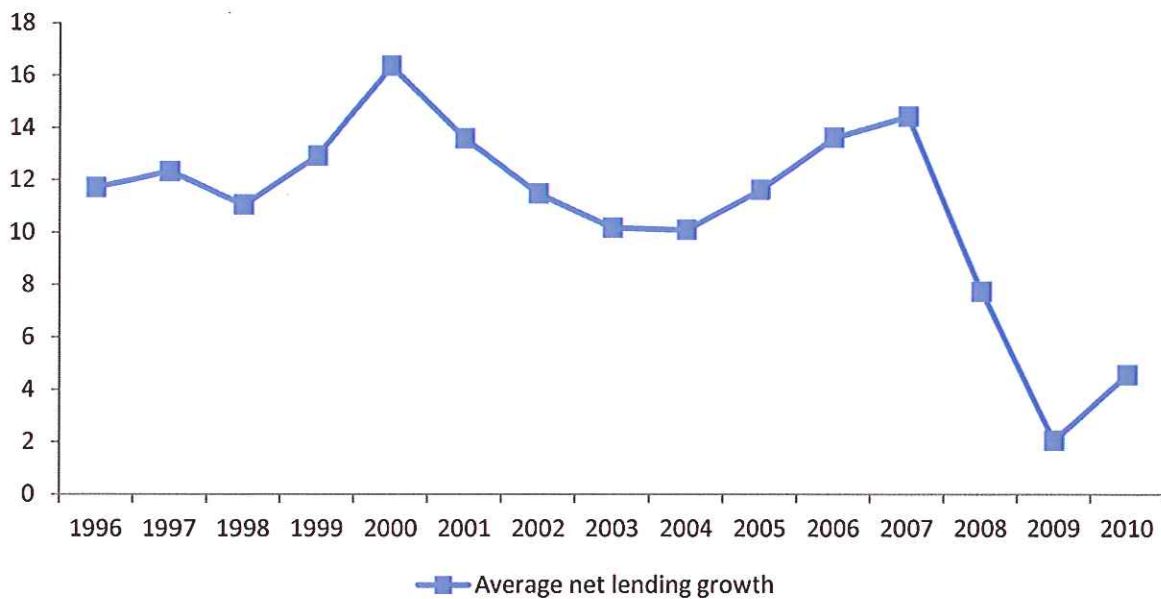
Moreover, Figure 10 puts the recent development in perspective as it shows the development in average annual net lending growth[20] for all Norwegian savings banks[21] from 1996 to 2010. The growth rate is quite elevated already in 1996, as the banking sector has seemingly emerged from the previous crisis. It reaches a temporary high in 2000, attaining 16.4%, before declining four years in a row. The growth rate starts rising again in 2005, only to plunge from 14.4% in 2007 to 2.1% in 2009. The average rate rebounds in 2010, as suggested by Figure 9. On a general note, the lending growth is a fairly volatile measure, seemingly fluctuating with business cycles.

7.5 Funding structure

Now taking a look at the development of the aggregated funding structure for all the savings banks in the sample, we first and foremost notice an overwhelming dependence on customer deposits (see Figure 11). This is a natural and sensible way of funding their business insofar as their business consists of providing credit to individuals and businesses. Moreover, we find a steadily increasing dependence on credit from credit institutions over the first three years depicted, followed by a decline in 2010. On the other hand, dependence on issued debt

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[20] Not weighted.
[21] No filtering of banks subject to mergers or acquisitions have been done in this case; at each point in time, all existing savings banks are included.

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securities has seen a general decline. This might be due to the deterioration of market conditions for the banks, and a subsequent swap from bonds to government support programs and central bank support loans. At the same time, the percentage of customer deposits decreased to some extent throughout 2009, suggesting that the banks were less and less successful in attracting deposits in 2007-2009, before seeing improved deposit levels in 2010.

Turning to a comparison between the supported banks and the other banks, it is quite clear from Figure 11 that the supported banks have been funded more heavily through issued debt securities and less through customer deposits in recent years, as compared to the other banks. In 2009, the supported banks saw an increase in debt to credit institutions as well as subordinated debt, more so than the remaining banks. This is probably due to more short-term funding from Norges Bank and the capital from the SFF, respectively. The former change is seen among the other banks as well, although the total share of their debt to credit institutions is still smaller than for the supported banks.

Figure 11: Aggregated funding structure.
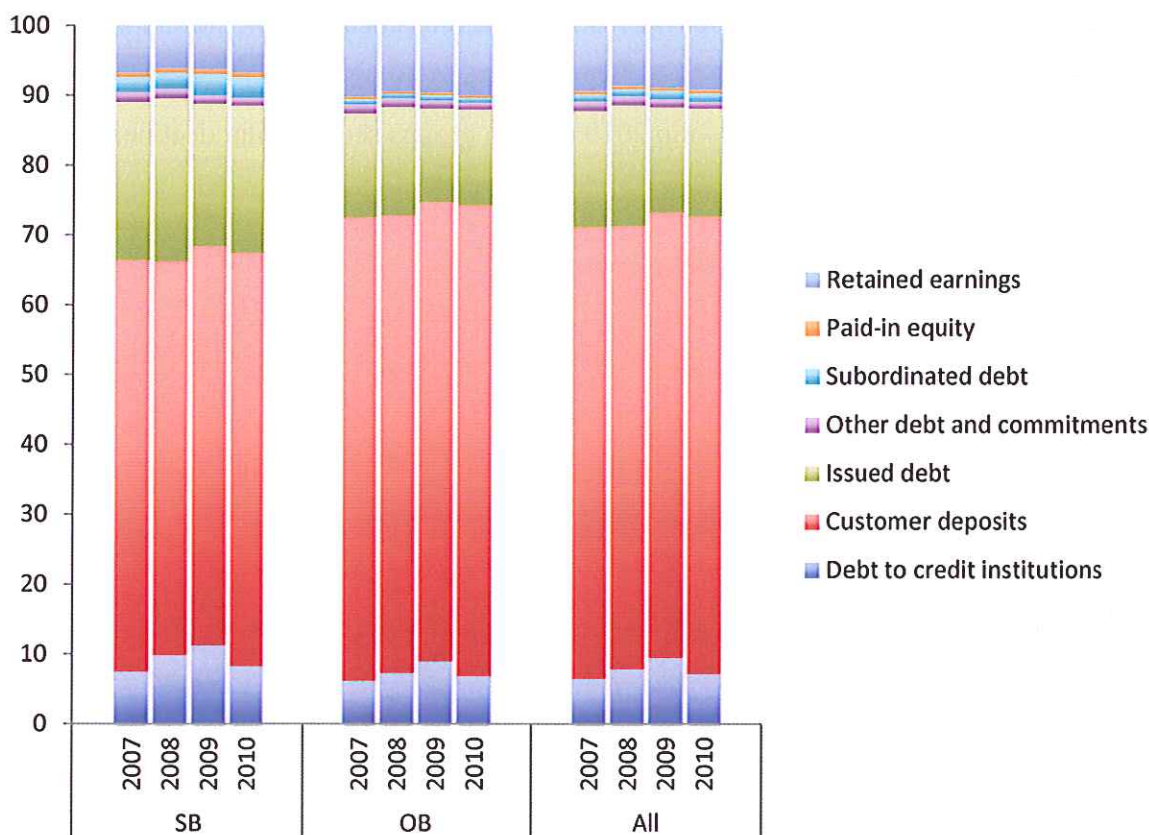
Note: Aggregated funding structure for supported banks (SB), other banks (OB) and all banks.

In spite of the financial crisis, retained earnings have seen an increase since 2008, especially for the SB. This might be the result of cutbacks on EC and PCC payouts in order to bolster the equity levels.

7.6 Write-downs

I will now have a look at the write-downs incurred during the period from 2007-2010. Figure 12 shows write-downs on individual loans as well as on groups of loans as percentage of the banks' gross loans. We see that the banks on average experienced an increase in 2008 and 2009 which was slightly more accentuated for write-downs on individual loans compared to groups of loans[22]. Average total write-downs reached a preliminary peak of 0.94 % of gross loans in 2009, equaling a total of NOK 4.12bn for the banks in the sample.

The natural question to pose is thus; how did the supported savings banks perform in terms of write-downs? As Figure 13 shows, they had less write-downs in percentage of gross loans than the non-supported banks in 2007 and 2008. However, this was turned upside down in 2009, after the supported banks had seen a substantial increase in this ratio since 2008 whereas it had increased only slightly for the rest. This development caused the supported banks to attain an average ratio of 1.00 % in 2009, up from only 0.56 % two years earlier. The figures are pointing in the right direction in 2010 as both groups see a similar decline.

Figure 12: Write-downs as share of gross loans. Entire sample.

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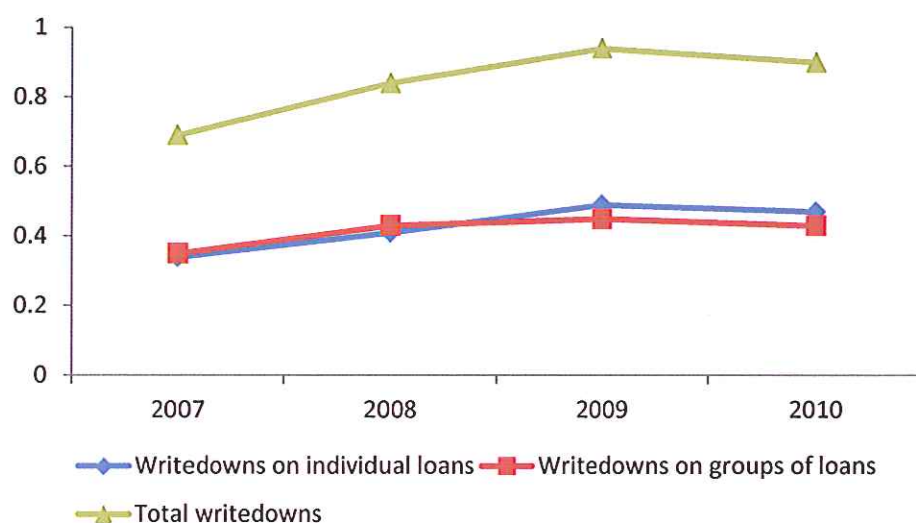
[22] Banks might write down groups of loans for instance by sector, if a sector is experiencing a dramatic fall in demand or something else leading the banks to revise their provisions.
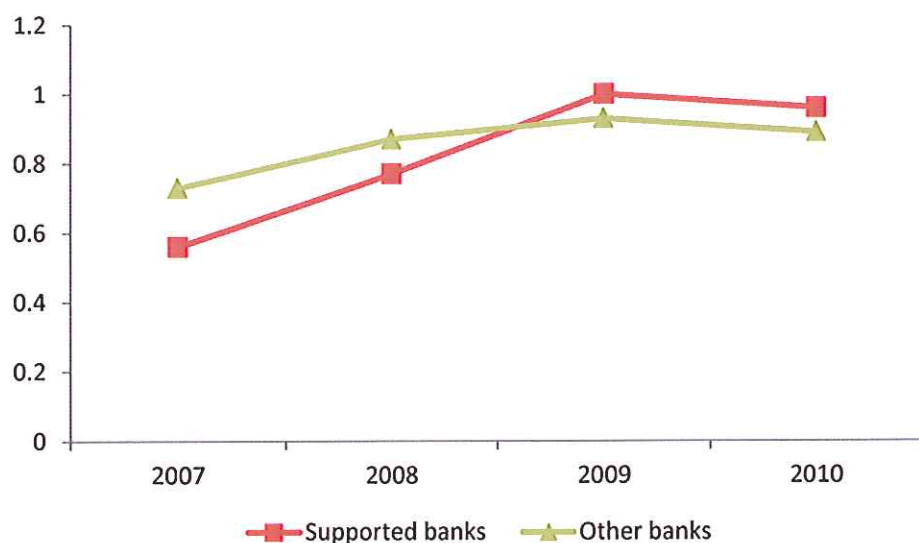
7.7 Deposits as share of gross loans

Given the development described in section 7.5 on funding structure, having a look at customer deposits as share of gross loans might add insight. In general, a savings bank should have an elevated deposit/loan ratio, since it is viewed as sensible to fund loans to households and firms with customer deposits to the greatest extent possible. As a matter of fact, no more than three small savings banks had such a ratio above 100 % in 2009.

The pattern given by Figure 14 is clear enough, showing a markedly lower deposit/loan ratio for the supported savings banks as compared to the remaining banks. SB have an average ratio of almost 68 % in 2007, meaning 68 % of their loans to customers were funded by customer deposits. Notice, however, the peculiar development in 2009. The supported savings banks experience an increase in deposits relative to loans. An interesting question is thus: Are they increasing their deposits or rather seeing a decline in loans? Having a look at Figure 9 on lending growth, the second option seems to be confirmed. The supported savings banks have increasing ratios due to lower credit growth and thus relatively more deposits as share of loans. At least, this indicates that the supported savings banks did not struggle primarily with diminishing deposit bases.

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Figure 14: Customer deposits as share of gross loans. Broken scale.
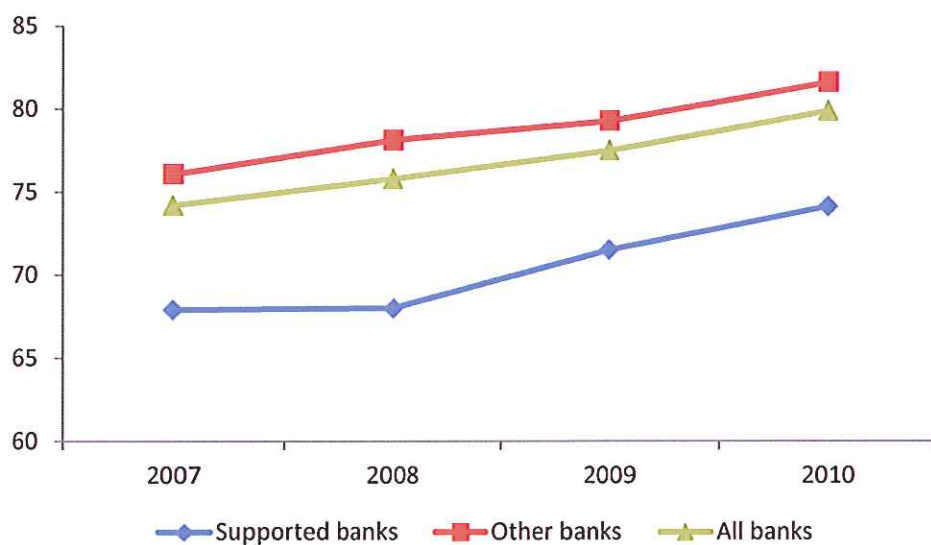
7.8 Growth in customer deposits

Related to Figure 14 on the banks' deposit/loan ratio, I asked whether the increase in that ratio was due to increasing deposits in absolute figures, or rather a decline in loans. Figure 9 on net lending growth showed a decline in lending growth, and thus suggested that a relative decline in loans to deposits might be the explanation for the improving deposit/loan ratio. When looking at pure growth in customer deposits as shown in Figure 15, this story remains ambiguous. Growth in customer deposits declined for all banks between 2007 and 2009,

Figure 15: Growth in customer deposits.
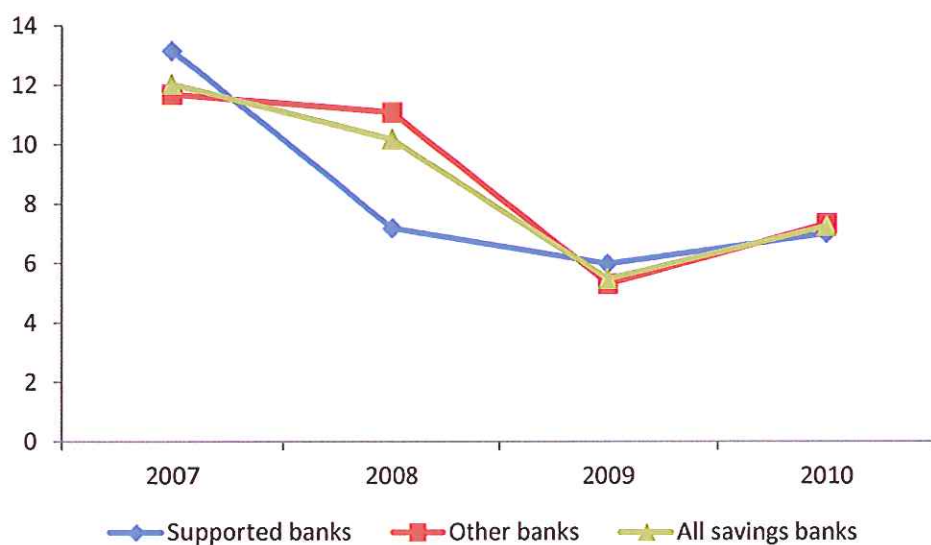
but SB saw most of this decline in 2008 whereas OB's growth rate declined mainly in 2009. However, this decline is less dramatic than the corresponding decline in lending growth, since the deposit/loan ratio shows an incline in the period. The growth in customer deposits rebounded in 2010, but is still only at 7.3 % (all banks); a level far below the pre-crisis level of 12.0 %.

7.9 Profitability

I have now established the facts that the supported banks have struggled with weaker capital ratios, slower lending growth, more write-downs and lower deposit/loan ratios, but how about profitability? Do these features necessarily transform into weak profitability as well? Figure 16 shows the banks' profits as share of average total assets (ATA). Both groups of banks have about the same average level of profitability in 2007, but this picture changes in 2008. Both groups experienced a decrease in profitability, but as the non-supported banks cut their profit-to-ATA ratio in half, the supported banks saw an even more drastic fall on average. The ratio improved vastly in 2009, however, and brought also the supported banks to a healthier level. The 2010 average ratios show that the supported banks are at pre-crisis levels on average, whereas the other banks have actually surpassed their average 2007 ratio.

This might not be very surprising, since we know SB were struggling more than OB on several accounts. Therefore, Figure 17 looks at the same ratio as Figure 16, but this time with operating profits before losses. If losses due to bad loans are the only difference between SB and OB, then their pre-loss profitability should be fairly equal. This is not the case, however, as SB's profitability is inferior to that of OB over the entire period, except when the ratios are at the same level in 2009. This suggests that write-downs on loans were not the only difference between the two groups. Weaker capital ratios might have led to lower lending growth and thereby lost profits for the supported banks.

Figure 16: Profits as share of average total assets.
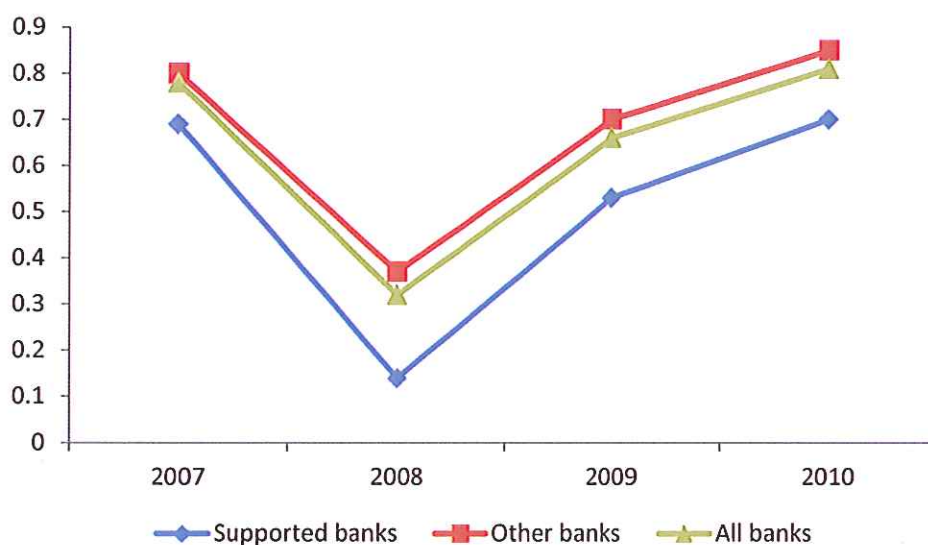
Figure 17: Pre-loss profits as share of average total assets.
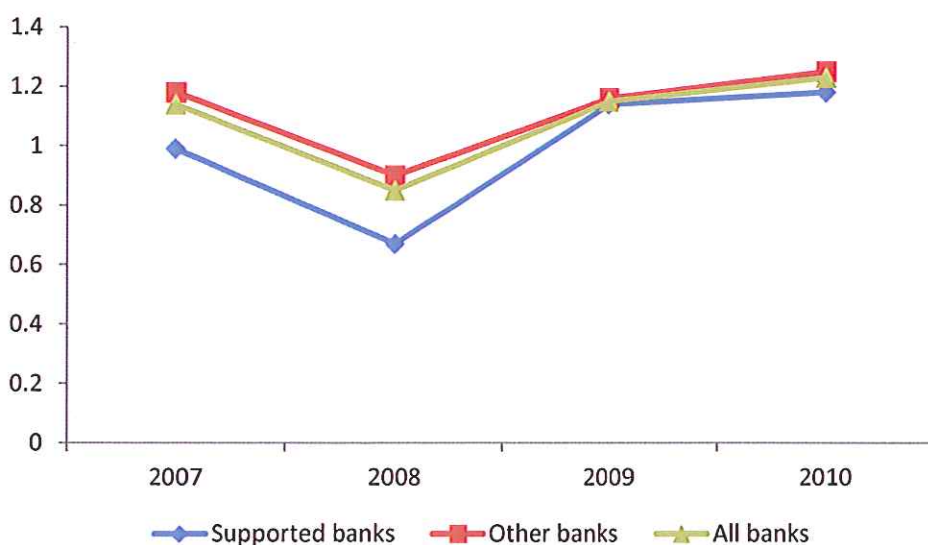
7.10 Cost/income ratio

The ratio of costs to income is a widely used measure of bank performance, and so it is instructive to look at that as well. Figure 18 shows operating costs as share of total income for the two groups as well as the average for the entire sample. From a fairly similar point of departure with costs equaling around 60 % of total income for both groups in 2007, the development takes a very different turn in 2008. SB see their costs relative to income rising vastly, while the opposite is the case for OB. This confirms the image drawn up by the

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Figure 18: Operating costs as share of total income. Broken scale.
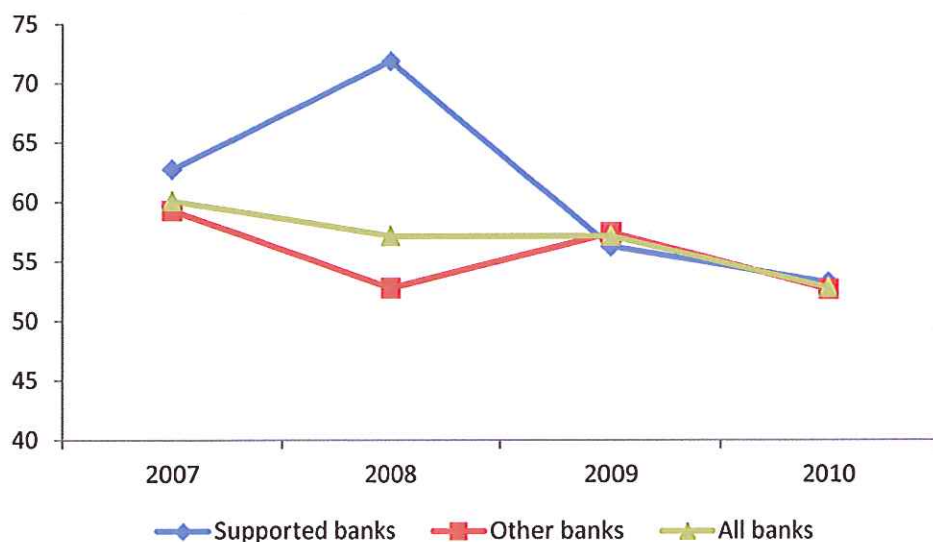
profitability ratios; SB got a lot less income out of each krone in costs than did OB in 2008, even before losses. However, this is corrected already in 2009, as both groups have a ratio of about 57 %. Such a development is consistent with the profitability ratios, but we know from Figure 13 that write-downs continued to rise also in 2009. This might indicate that the supported banks were able to reign in their cost disadvantage in 2009, even though they still had to incur losses on bad loans.

7.11 Geographical distribution

It is interesting to look at where the supported banks are located when trying to figure out what caused the need for government investment. All figures in this sub-section include all savings banks that existed in 2009 in order to create a correct picture of the conditions at that very moment. As we can see from Figure 19, showing each regions share of the total number of supported banks, some regions have more banks represented than others, and others again have none. This chart shows that Sør-Trøndelag has the highest share of the supported banks (19 %), followed closely by Telemark (15 %) and Akershus, Rogaland and Aust-Agder (11 %).

Figure 20 shows the absolute number of supported banks in each region, along with that region's total number of savings banks. Sør-Trøndelag has by far the greatest number of savings banks, as well as the greatest number of supported banks. On the other hand, the 2nd and 3rd most dense regions in terms of total number of savings banks were Møre & Romsdal

and Oppland in 2009. Despite this, they are not among the regions with the most supported banks, with one supported bank each. This indicates that there might have been regional differences in how hard the banks were hit by the crisis, or alternatively differences in bank management across regions. Figure 21 gives an even more clear picture of this, as it shows each region's number of supported banks relative to total number of savings banks. This differed widely, from zero in Troms, Finnmark, Nordland, Hedmark, Østfold and Oslo to 43 % in Akershus and Rogaland and 44 % in Telemark. All in all, the supported banks were widely spread across the country and the proportion of supported banks to all banks varied across regions.

Figure 19: Geographical distribution of supported savings banks.
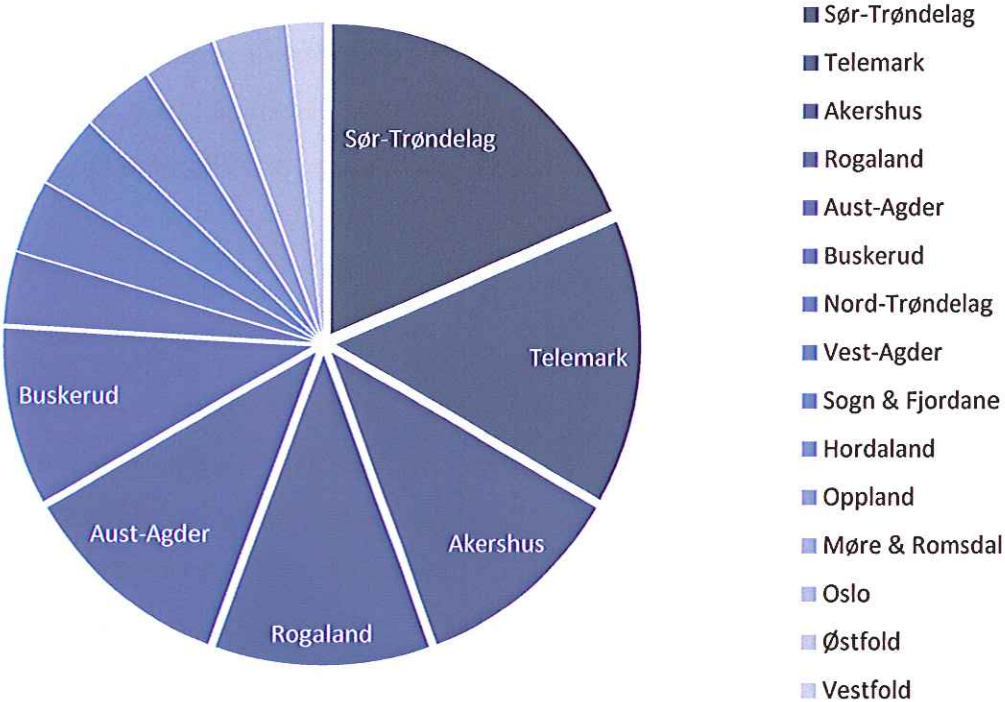
Note: This figure includes the three banks that received support from both the State Finance Fund (see Table 2, section 6) and the Government Bond Fund as well as the merged entity Sparebank 1 Buskerud-Vestfold, which received support from the SFF.

Figure 20: Number of supported banks and other banks per region.

Legend: ■ Supported banks ■ Other banks
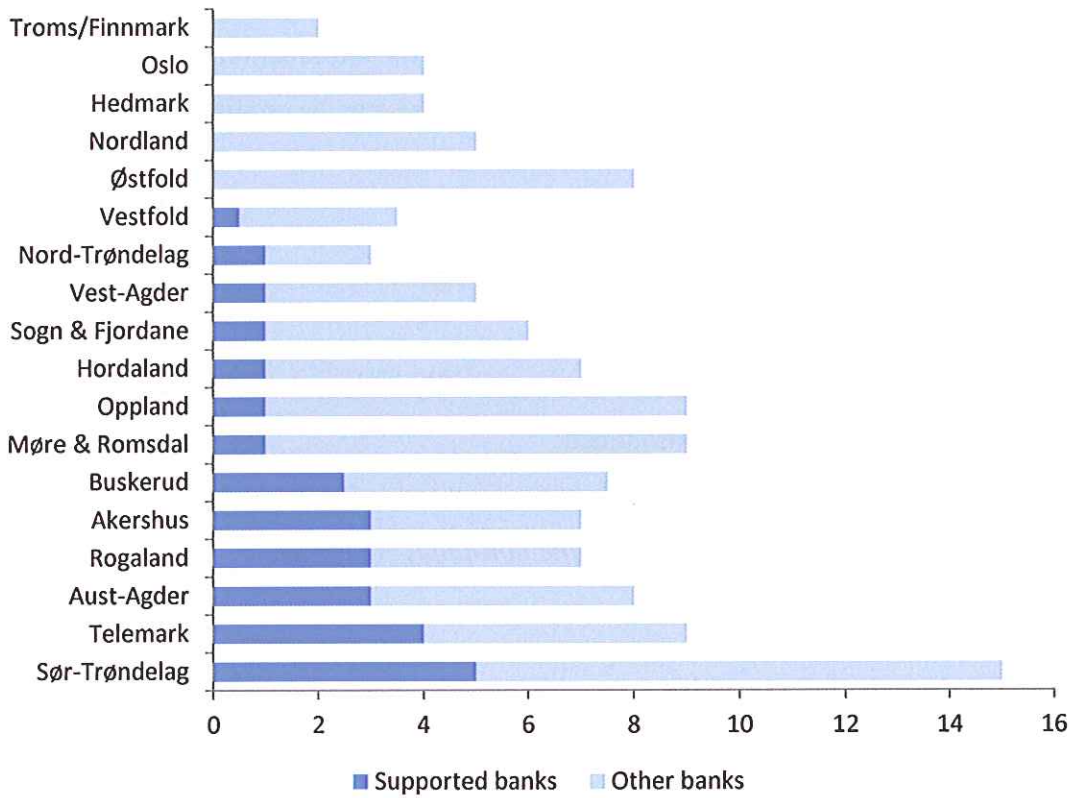
Note: This figure shows all existing savings banks in 2009.

Figure 21: Number of supported banks as share of total number of banks per region.
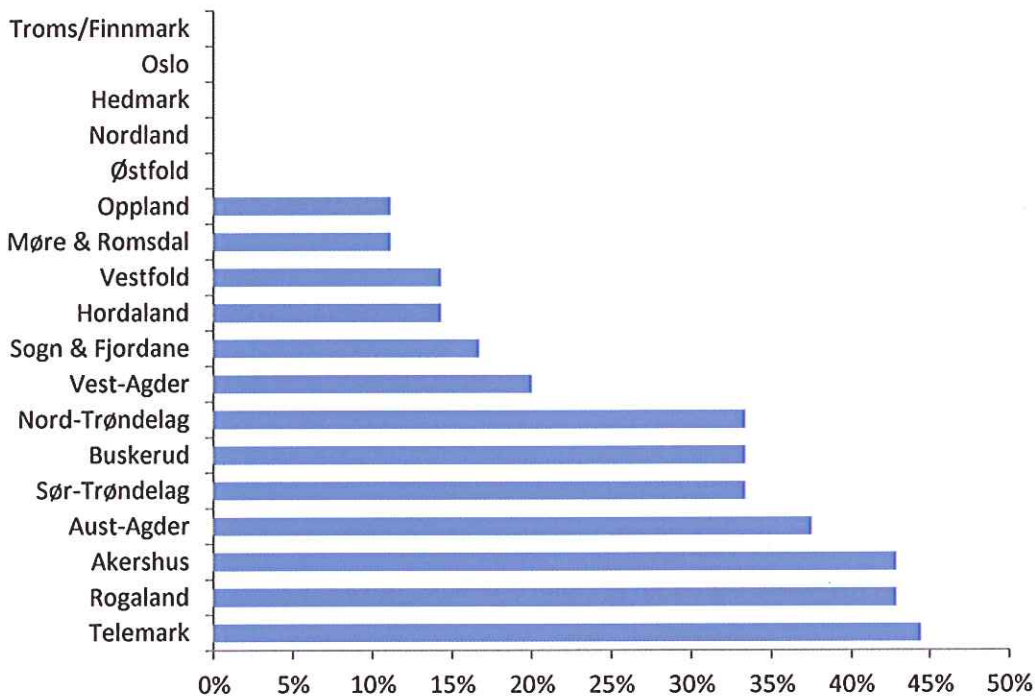
Note: This figure shows all existing savings banks in 2009.

8 What characterized the supported banks?

It is now time to return to the first research question stated in the introduction along with its hypothesis. In this section, I will discuss whether the hypothesis can be confirmed or not, based on the statistics laid out in section 7.

(1) What characterized the banks that chose to apply for, and received, government support in 2009?

Based on the idea that banks applying for capital are generally in a more dire financial situation, the following hypothesis was introduced:

Hypothesis (1): The banks choosing to apply for government support showed inferior results on all indicators of financial health compared to the non-applying banks.

8.1 Results from descriptive statistics

The supported banks indeed showed inferior capital ratios for 2007 and 2008, while the capital from the SFF bumped their Tier 1 ratios to higher levels in 2009. However, they are still trailing at lower levels than the remaining banks. Additionally, SB were ahead on net lending growth in 2007, but lost their position and have experienced a lower growth rate than OB since 2008. As for write-downs, SB's ratio of write-downs to gross loans was actually lower (thus better) than OB in 2007. However, this rose in 2008 to become superior to that of OB prior to the allocation of the SFF capital. Furthermore, the 23 banks in my sample that received state support had on average a 8-10 pp lower deposit/loan ratio than the other banks in 2007 and 2008. This improved slightly in 2009, but they are still about 7 pp behind in 2010. The development of growth in customer deposits has been somewhat similar to that of net lending growth, although it has never been below 5%; SB's average growth rate was slightly higher than OB's in 2007, way inferior in 2008, then equal to OB's in 2009 and once again inferior to some extent in 2010.

With regards to profitability, both profits as percentage of ATA and operating profits (pre-loss profits) as percentage of ATA show the same picture: SB were generally less profitable than OB in the years prior to the support. Moreover, SB's average cost/income ratio was quite similar to that of OB before deteriorating vastly in 2008. The two groups are back at the same level in 2009 and 2010, however.

Even though geographical location within Norway is not an indicator of financial health, it is nevertheless interesting to look at. The supported savings banks were well dispersed, except there were none up north (Nordland, Troms and Finnmark). Both regions with many and few savings banks had banks in need of support, and supported banks made out more than 40 % of savings banks in both Telemark, Akershus and Rogaland.

8.2 Alternative explanatory factors

In explaining what characterizes the supported banks, there are obviously also factors that I cannot account for. A non-applying bank may have been in an equal situation as an applying bank, but decided to opt out because the management was somewhat less risk-averse and thereby found SFF capital to be expensive and unnecessary; the bank would be fine without additional capital. Also, a bank's board may have chosen to go forward without SFF capital in order not to risk being replaced. Similarly, the announced freeze on executive pay may have tilted a considering bank to abstain from support.

Furthermore, one can assert that a bank may have chosen to apply due to specific local market conditions: Consider a bank with a small primary market which is quite dependent on its exposure to certain local firms. If demand is unlikely to pick up quickly, then estimated future losses might be a good reason to apply even though the bank's financial health is ok at the moment.

8.3 Sub-conclusion

All in all, it seems clear that the savings banks who chose to apply for government support in 2009 were, on average, worse off on all accounts of financial health even though they were better on some indicators in 2007. Hence, my hypothesis (1) is confirmed. Although other factors may have played a role, the observable indicators reported in section 7 seems largely to explain the choice of applying for government support.

Analysis – Part II

9 Methodology

This thesis examines the effect on lending growth of participating in a program, where the program participants are the savings banks that received capital from the Norwegian State Finance Fund, and the other savings banks function as a control group[23]. There are several ways one can go about when undertaking such a program evaluation study. Many estimation methods run into problems related to endogeneity. This entails one or more of the explanatory variables in the regression equation being correlated with the error term. These factors in the error term are unaccounted for in the regression and will cause any estimate to be biased (Wooldridge, 2009). In order to fully avoid endogeneity issues, one would have to include all variables (or instruments for these) that potentially influence the dependent variable, in my case a bank's lending growth. It goes without saying that this would be difficult, at best. Problems related to endogeneity can be minimized, however, by using a method called a *matching estimator*. The sections below will describe the econometric features of the "nearest neighbor" matching estimation method and what to keep in mind when adjusting such a model. Section 9.2 will describe the features of propensity scores and propensity score graphs, which will subsequently be used to assess the matching capacity of the model. Finally, section 9.3 will lay out the considerations I have taken when building my matching estimator model.

9.1 Nearest neighbor matching estimator

Matching estimators have grown in popularity among researchers in recent years due to their good fit for program evaluation as well as they being quite unproblematic to implement[24] (Abadie & Imbens, 2002). I have decided to use a difference-in-difference nearest neighbor matching estimator in my thesis, since this method seems to fit my data well and minimizes problems related to endogeneity.

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[23] These groups do not include all savings banks; see section 6.
[24] For examples, see Temin & Voth (2008) on interest rate restriction and loan allocation, Galiani, Gertler, & Schargrodsky (2005) on water privatization, Bharath (2002) on banks and agency costs or Jalan & Ravaillon (1999) on income gains for the poor.

9.1.1 What is a matching estimator?

The nearest neighbor matching estimator[25] produces an estimate of the counterfactual scenario of some kind of treatment. In my case, it will estimate the effect of the SFF capital infusions (the treatment) on the supported banks (the banks exposed to treatment) by estimating what has happened to similar, untreated banks. The estimator does this by pairing together (matching) treated and untreated banks who have similar values on a certain range of matching variables. It starts by matching a treated bank with its nearest untreated neighbor in terms of values on the matching variables, then the second-to-nearest et cetera. This leads to an estimate of "the unobserved potential outcome for each observation in the sample" (Abadie, Drukker, Herr, & Imbens, 2004), which in turn generates the average treatment effect for the treated banks. This is called the Simple Average Treatment effect on the Treated (SATT) [26]. In measuring the effect of a certain policy (here, the SFF capital infusions), the most interesting feature to look at is the effect on the banks that received treatment (Abadie, Drukker, Herr, & Imbens, 2004). My analysis will therefore rely on the results from the SATT estimations.

9.1.2 Self-selection bias

Performing matching estimations includes some issues which need to be thoughtfully taken care of. Firstly, a common issue when evaluating the effect of treatment is self-selection bias. This occurs whenever there is reason to believe that the treated individuals were not randomly chosen, but rather chose to opt for treatment because of the expected benefit.

My data are subject to self-selection. The banks have themselves chosen to apply for funding, and the allocation of treatment must therefore be seen as self-selected. However, many of the characteristics that may confound the identification of the treatment effect in such cases are ones that vary across banks but not over time. A simple example can be to compare a good bank and a bad bank. The good bank has a high lending growth rate both before and after the

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[25] The matching estimator estimates $y_{it} = \alpha dl_{it} + \beta X_{it} + \gamma_t + \mu_i + \epsilon_{it}$, where y_{it} is change in net lending growth, dl_{it} is a dummy variable indicating whether the observation is treated or not, X_{it} is a vector of matching variables, γ_t controls for time-varying effects fixed across banks, μ_i controls for time-invariant effects varying across banks and ϵ_{it} is the error term capturing variations not correlated with γ_t nor μ_i. Here, α is estimating the treatment effect.

[26] Stata's command *nnmatch* allows for nearest neighbor matching and is able to compute several interesting policy effects. ATE is the average treatment effect, and is the estimated treatment effect averaged over all observations. SATE is the sample average treatment effect. PATE is the similar effect for the whole population. SATC is the sample average treatment effect for the control group.

treatment, and thus the difference in growth rates is small. Correspondingly, the bad bank has a low lending growth both before and after the treatment, and has an equally small difference in growth rates. As a result, time-invariant effects can be controlled for by using the difference-in-differences (DID) matching estimator, which compares the change in credit growth before and after the support for the treated banks to the corresponding change for the untreated banks (Galiani, Gertler, & Schargrodsky, 2005). Consequently, the DID estimator "allows selection into the program to be based on anticipated gains from the program" (Todd, 2008).

Moreover, I need to be convinced that the conditional independence assumption (CIA) is satisfied, i.e. that selection into treatment is driven only by observable factors (Nannicini, 2007). As discussed in section 8, the financial indicators presented in section 7 seem to explain the choice of applying for government support. These are definitely observable factors, and thus I consider the CIA to be satisfied in this case. Also, the matching estimator requires matching variables that are not directly affected by program participation. Hence, potential matching variables should be characteristics of the banks prior to getting support (Todd, 1999). I will adhere to this by using financial indicators for 2007 as matching variables (see section 9.3).

Adjusting the model in the fashion described above effectively minimizes the self-selection bias.

9.1.3 Other bias and heteroskedasticity
Apart from self-selection bias, the matching estimator will be biased in samples with continuous matching variables where the matching is not exact. This is because the biased estimator will include a term for the discrepancies between matched observations and their matches (Abadie, Drukker, Herr, & Imbens, 2004). This is an issue with my data, since my matching variables are continuous ones, and the matching is not expected to be exact. In order to remove this bias, I use the bias-corrected matching estimator. This slightly more advanced version of the matching estimator adjusts the difference within the matches for the differences in their matching variable values (Abadie, Drukker, Herr, & Imbens, 2004).

Moreover, heteroskedasticity is a problem if the variance of the error term changes across different values of the matching variables (Wooldridge, 2009). This might be the case for my sample, and will be corrected for by running the estimator with robust standard errors.

Lastly, when deciding on number of matches, it is a question of including enough matches to obtain a sufficient amount of data and at the same time not include matches that are not sufficiently similar (Abadie, Drukker, Herr, & Imbens, 2004). In other words, there is a trade-off between quantity of quality of matches. I will present a sensitivity analysis for number of matches in order to obtain the ideal number.

9.2 Propensity score

This section will give a brief explanation of the concept of propensity scores, since propensity score graphs will be used to control the matching capacity of the model. That is, I will not use propensity scores as a matching method, but merely as a control of the matching capacity of each matching variable as well as each estimated model in its entirety.

The propensity score is defined as the probability of taking treatment given a vector of observed variables (Becker & Ichino, 2002). In other words, if measured by the 2007 values of a specific variable, Stata[27] will obtain a bank's probability of being among the supported banks based on the distribution of the 2007 values[28]. Since the propensity score is a measure of probability, it exclusively takes on values between 0 and 1. If there are both supported banks and other banks within the same intervals of a variable's propensity score, this variable would normally make a good matching variable.

The distribution of propensity score intervals is nicely shown in a propensity score graph[29](see Figure 22). If there is no overlap between treated and untreated banks, the data can simply not be used for matching. That is, matching can always be done, but the results will be inappropriate (Oakes & Johnson, 2006).

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[27] Stata is a statistical software for data analysis.
[28] I use the Stata's command *psmatch2* to calculate the propensity score.
[29] Generated by Stata when running *psgraph* directly after the *psmatch2* command

Figure 22: Fictitious propensity score graph showing a data set inappropriate for matching.
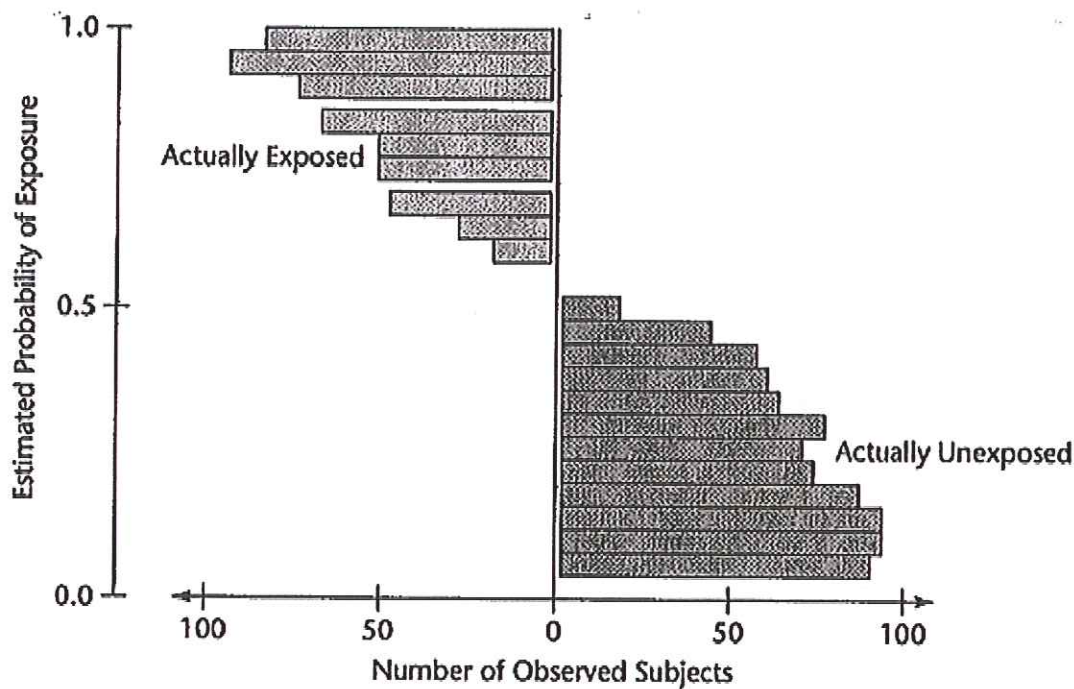
Source: Oakes & Johnson (2006)

9.3 Choice of model

This section will lay out the structure of my econometric model. When building a matching estimator model, as with other types of econometric models, one needs to be rigorous in choosing which variables to include and which to exclude. To make sure my model is defensible, I have employed economical logic, looked at propensity score graphs as well as conducted exclusion tests (starting with a full model, then excluding one variable at a time to look at each variable's isolated effect, ceteris paribus). This process has led me to the best-fit model described next, while some alternative specifications and robustness tests are presented in appendix 1.

9.3.1 Dependent variable

Since I am analyzing the effect of government support on net lending growth, net lending growth is my dependent variable. Given my model being a difference-in-difference model as described in section 9.1, I use the change in net lending growth from 2008 to 2010 as dependent variable. That way, the model eliminates time-invariant effects which may confound the results. I have previously mentioned that the potential effect from the capital infusions on the net lending growth was expected to occur in 2010. Since the decision to

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establish the fund was taken already in February 2009, however, there might have been anticipatory effects. That is, banks may have dared to plan for increased lending growth already in 2009 knowing that there would be funding available. The model captures this by using the change in net lending growth rate between 2008 and 2010 instead of between 2009 and 2010.

9.3.2 Matching variables

In choosing matching variables, it is instructive to think about what I actually want to use these matching variables for. When analyzing the net lending growth development, which is the dependent variable all along, the banks' financial health is central. Looking at the descriptive statistics in section 7 and the related discussion in section 8, it follows that the state of each bank's financial health in 2009 was in some way correlated to the decision of applying to the State Finance Fund. Therefore, it seems logical to include matching variables that function as parameters of a bank's financial health. I thereby ensure that the supported banks are matched with non-supported banks with fairly similar states of financial health in 2007, well before the financial crisis affected the Norwegian economy in any substantial way. Furthermore, it makes sense to ensure that the matching process adjusts for size differences between banks; a relatively large bank should rather be matched by another relatively large bank than a much smaller one. A proxy for size should therefore be included.

The final model thus includes the following matching variables:

- Write-downs as share of gross loans
- Pre-loss profits as share of average total assets
- Cost/income ratio
- Net lending growth
- Depreciation of fixed assets

All matches are done exclusively on 2007 numbers. This is in order to avoid biased results caused by program participation or anticipated program participation. These variables are all parameters of a bank's financial health with the exception of depreciation of fixed assets, which is a proxy for size. I will return to this below.

Write-downs as share of gross loans were at a fairly low level in 2007, at least compared to what was to come in subsequent years. On average, the group of supported savings banks experienced somewhat lower levels of write-downs as percentage of gross loans than did the rest of the savings banks. As for pre-loss profits as share of ATA in 2007, the SB have a somewhat lower average ratio. Turning to the cost/income ratio, both groups of banks have fairly similar average ratios in 2007. Concerning net lending growth, the SB had a somewhat higher growth rate than the OB in 2007, and depreciation of fixed assets was also higher for the SB in 2007. Thus, these five variables represent a balanced picture of the supported banks' financial health compared to the other banks, which should facilitate the matching.

Isolated, each of the first four variables shows a well dispersed propensity score graph (see appendix 1), which tells me that their usability for matching is good. These first four variables are all ratios or growth rates, whereas the last one, depreciation of fixed assets, is measured in MNOK. Since the banks are matched one on one, this variable provides adjustment in terms of each bank's size as mentioned above. A bank's fixed assets will in most cases be the real estate it owns to house its branches and offices. Thus, the larger the bank, the more branches and offices, and the higher the value of annual depreciation of fixed assets[30]. Even though the propensity score graph for this variable isolated is not particularly well-dispersed (see appendix 1), it does not harm the matching capacity of the model, it is important in order to adjust for size, and, equally important, it renders the result more significant.

9.3.3 Number of matches and bias-adjustment

Finally, it is necessary to deduct the optimal number of matches and adjust for biased variables. Sensitivity tests reveal that the model seems to capture the necessary amount of relevant information without including observations which are too dissimilar when using three matches (see appendix 1). I bias-adjust for all variables in order to allow for heteroskedasticity.

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[30] Why not use Average total assets as size indicator? When replacing Depreciation with Average total assets, the result is rendered less significant. It might seem that Depreciation captures the size differences, but on a smaller scale, which works better in this model.

10 The effect of government support

This section will first report the main econometric result of the thesis, before providing an answer to research question (2) postulated in the introduction. Finally, it will discuss what might explain my results and what would have happened in a scenario with no similar government support.

10.1 Estimated effect of capital infusions on net lending growth

Using the model described in section 9.3, I find an estimated effect of the capital infusions on the supported banks' change in net lending growth from 2008 to 2010 of 4.51 percentage points (pp) (see estimation of model M1, Table 3). Since this is a counterfactual analysis measuring the treatment effect, the result means the supported banks would have experienced a 4.51 pp weaker change in net lending growth between 2008 and 2010 if they were not supported in 2009[31]. The SFF itself forecasted a net lending growth for 2010 of 6.52 % with support as opposed to 1.77 % without support[32], which means an estimated treatment effect of 4.75 percentage points. These two estimates are not directly comparable, since my estimation is the effect on change in net lending growth rate between 2008 and 2010, whereas the SFF's estimation is the effect on net lending growth in 2010. This difference notwithstanding, my result goes far in confirming the average treatment effect forecasted by the State Finance Fund. However, as we will see, this estimate is not robust to all attempted modifications.

10.1.1 Robustness test: Inclusion of relevant matching variables

The estimated SATT[33] coefficient for M1 is significant on a 1 % level and has a standard error of 1.59. Checking for robustness by making logical adjustments to the model is instructive. Adjusting the model by including deposit/loan ratio for 2007 (model M2, Table 3), being an indicator of financial health with a relatively well-balanced and well-dispersed propensity score graph , yields a result which is not too far from the original one,

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[31] What it literally says is that the banks being used as matches (thus being fairly similar to their respective matched supported banks in terms of size and financial health in 2007) experienced a change in net lending growth rate which was on average 4.51 pp lower than the supported banks from 2008 to 2010.
[32] These numbers are weighted averages of lending growth for the supported banks, based on the banks' reported planned lending growth.
[33] Simple Average Treatment effect on the Treated.

	M1 Change in net lending growth 2008-2010	M2 Including Deposit/loan ratio	M3 Including Losses on Loans and Guarantees	M4 Including Tier 1 ratio
SATT	4.51**	3.47*	2.65	6.34***
	(1.59)	(1.68)	(1.71)	(1.88)
Observations	100	100	100	100

Standard errors in parentheses
$^*p < 0.05, ^{**}p < 0.01, ^{***}p < 0.001$

Note: All estimations show the effect of the capital infusions on change in net lending growth between 2008 and 2010. For M2, M3 and M4, the upper row specifies the difference from model M1.

albeit this time it is significant only on 5 % level. Moreover, Losses on loans and guarantees in 2007 (measured in MNOK) is an indicator of financial health as well as size, which makes it interesting to include (see model M3, Table 3). The result from this estimation is no longer significant, but the coefficient is still positive at 2.65. Furthermore, Tier 1 ratio for 2007 has an isolated well-balanced and well-dispersed propensity score graph (see appendix 1), which makes it interesting to see how the model reacts when this is included. The coefficient is now 6.34 and thus larger than M1. It is also significant on a 0.1 % level. However, the propensity score graph of model M4 is not as well-balanced as the rest and I therefore find M4 to be less fit for matching. The general conclusion from these alternative models is that the model seems somewhat robust to inclusion of certain other variables.

10.1.2 Robustness test: Excluding Sparebank 1 SMN and Sparebanken Vest

Sparebank 1 SMN received by far the largest amount of capital (see Figure 6), and it is therefore interesting to check how robust the model is when excluding this bank from the dataset. As shown by estimation (1) in Table 4, the result is less significant but still significant on a 5 % level. Equally interesting, the coefficient is somewhat smaller but does not alter the conclusion in any way. Estimation (2), Table 4 shows the SATT when the two largest banks in the sample, Sparebank 1 SMN and Sparebanken Vest, are excluded. These are also the ones who received the most capital in absolute terms, and among those who had their Tier 1 ratio increased the most. The coefficient is still positive at 2.80, but with a p-value of 0.104 it comes just short of being significant on a 10 % level.

Table 4: Model M1 when excluding large banks.

	(1) Change in net lending growth 2008-2010	(2) Change in net lending growth 2008-2010
SATT	3.58*	2.80
	(1.61)	(1.73)
Observations	99	98

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Both estimations (1) and (2) exclude Sparebank 1 SMN. Estimation (2) also excludes Sparebanken Vest.

This means that the average effect on the remaining supported banks was actually insignificant, albeit close to being significant. This result underlines the importance of using econometric methods in addition to looking at aggregate figures.

Further tests for robustness by excluding matching variables from the full model are reported in appendix 1.

10.1.3 Propensity score graphs

The propensity score graph of model M1 looks quite well balanced (see Figure 23). There are untreated banks with similar propensity score as treated banks in almost all cases (in contrast to the fictitious Figure 22 in sub-section 9.2), which tells me that this model is well fit for matching. The corresponding graphs for M2 and M3 are somewhat less balanced, but their matching capacity is ok. On the contrary, M4's propensity score graph is not as well-balanced as the other three. Hence, as previously noted, this model is not as fit for matching. Figure 24 shows the propensity score graph of M1 when excluding Sparebank 1 SMN and Sparebanken Vest from the sample. The apparent difference is the two red columns with high propensity score in M1's original propensity score graph, which now disappear. As a result, the propensity score graph of M1 excluding the two large banks suggests that the matching capacity is improved compared to the original M1.

The propensity score graphs for each individual variable are reported in appendix 1.

Figure 23: Propensity score graphs for estimation models.
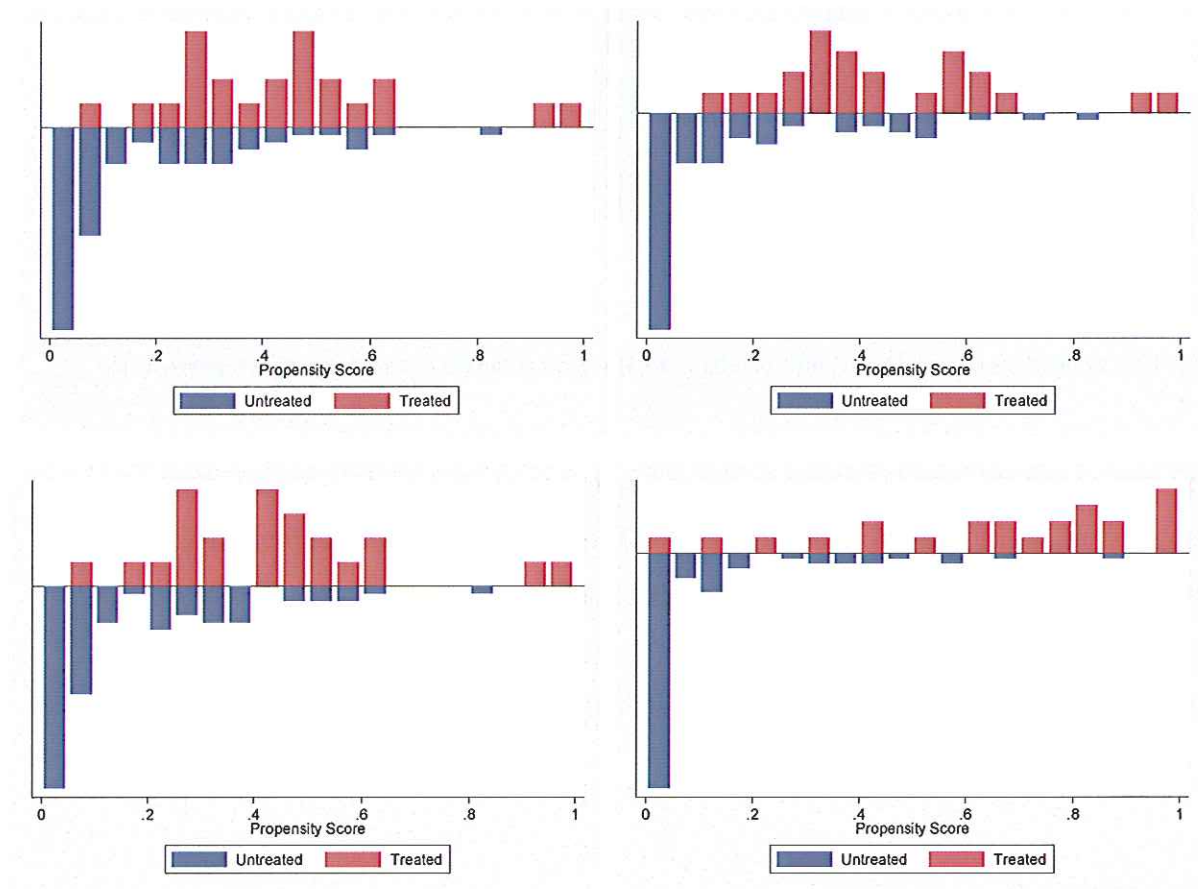
Note: Models M1 (top left), M2 (top right), M3 (bottom left) and M4 (bottom right).

Figure 24: Propensity score graph for model M1 excluding large banks.
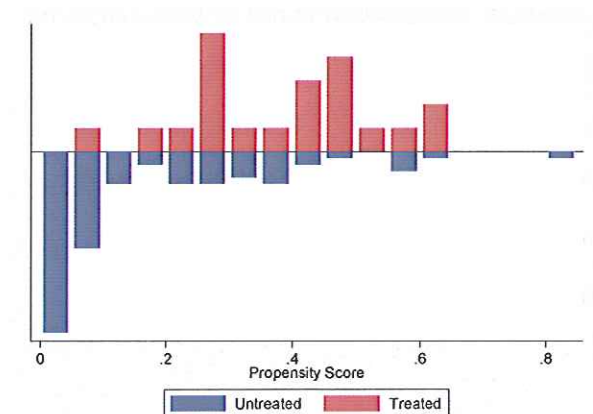
Note: Propensity score graph for model M1 when excluding Sparebank 1 SMN as well as Sparebanken Vest from the sample.

10.2 Discussion of result

Having stated in section 10.1 that the effect of the SFF capital infusions on the change in net lending growth between 2008 and 2010 was 4.51 percentage points (pp) as compared to the SFF's estimated effect of 4.75 pp, albeit not robust to the exclusion of the two largest banks, I now turn to a discussion of this result with the second research question and its hypothesis as a basis point.

(2) What effect, if any, did the government support have on the supported banks' lending growth compared to the non-supported banks?

On the basis of statistics from the period after the banking crisis in Norway in the early 1990s (Sandal, 2004) presented in section 3, as well as the SFF's own expectations, I derived the following hypothesis:

Hypothesis (2): The capital allocated by the State Finance Fund has had a positive effect on the supported banks' net lending growth.

10.2.1 Mechanisms hampering the effect of capital infusions on net lending growth

My results seem to confirm the hypothesis to some extent, but variations of the model do not always yield a significant result (for example when excluding Sparebank 1 SMN and Sparebanken Vest). It is therefore appropriate to pose the following question: Could there be mechanisms hampering the effect of the capital allocations undertaken by the State Finance Fund?

Firstly, as the supported banks were in dire states in 2009, relative to the other banks, the bolstered capital levels resulting from the SFF capital infusions provided the banks with temporary relief. However, as the minds of the executives in the supported banks were concentrated on even more precarious matters, increasing lending growth may not have been their main concern.

Secondly, the risk-averseness of bank executives may have played a role. When in the business of writing down loans and incurring losses, the appetite for heavily increasing the loan portfolio may not have been the best. This may have regarded new executives and board members put in place by the SFF as well. If they were even more risk-averse than the previous management in order not to incur further losses, then one could assume increasing the loan portfolio was not a priority. Thirdly, some of the smaller banks may have struggled

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with little demand for commercial loans in regions where firms had debt repayment issues already, and they may therefore simply not have been able to increase lending in a desirable fashion.

Also, several of the supported banks seem to have been well capitalized even prior to support, and can be assumed to have applied just to be on the safe side (corroborated by for instance Aurskog Sparebank's annual report for 2010 (Aurskog Sparebank, 2010)). In this case, the banks in question may not have adjusted their lending growth plans when receiving the SFF capital, but instead cautiously held forth with their planned low lending growth. Moreover, all supported banks were profitable in 2010 (after losses and write-downs). Since lending is a bank's source of profits, one would suspect a bank to chase higher lending growth if the profitability was in question. It might seem, however, like the profitability in general was not under threat, and therefore other issues than increasing net lending growth were prioritized.

Summing up, there are several mechanisms that might have hampered the desired effect from the capital infusions among the supported banks: Risk-averseness among bank executives, banks applying to be on the safe side as well as an insufficiently perceived need to increase lending growth. These might be explanatory factors for why my result is not more robust.

10.2.2 Would more capital further improve the lending growth rates?

Having ascertained that the effect of the capital infused by the State Finance Fund on net lending growth was positive and significant, but not very robust to alternative model specifications, it is pertinent to ask whether there would have been an even more accentuated effect if more capital were allocated.

If this were the case, then those banks in my sample having had their Tier 1 ratios increased more (hence more capital received relative to risk-weighted capital) should have experienced a better lending growth development than did those whose increase in Tier 1 ratio was smaller. Was this the case?

Table 5: OLS regression of change in net lending growth.

	(1) Change in net lending growth 2009-2010	(2) Change in net lending growth 2009-2010
Estimated increase in Tier 1 ratio	14.50 (7.80)	
Estimated increase in Tier 1 ratio at least 2 pp		8.36* (3.77)
Constant	-26.41 (15.77)	0.19 (2.08)
Observations	23	23

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Regression (1) shows the effect of an estimated increase in Tier 1 ratio (due to the SFF capital infusions) of 1 percentage point on change in net lending growth between 2009 and 2010, whereas regression (2) shows the corresponding effect if there was an increase in Tier 1 ratio (due to the SFF capital infusions) of 2 percentage points or more (dummy variable).

Table 5 shows that an estimated[34] one percentage point increase in a supported bank's Tier 1 ratio explains a change in net lending growth between 2009 and 2010 of 14.50 percentage points. Alternatively, banks that had their Tier 1 ratio increased by 2 percentage points or more saw a 8.36 percentage points bigger change in net lending growth rates. These results are based on 23 observations, include only one explanatory variable, suffer from obvious endogeneity problems[35] and are thus highly suggestive. However, they serve as an indication, which indeed tells us that a higher increase in Tier 1 ratio might lead to a bigger positive change in net lending growth rate. In other words, the effect of the capital allocated by the SFF on the change in banks' net lending growth rates might have been more accentuated if even more capital were infused. Although intriguing, this would only have a limited effect as long as the SFF would not let any bank finance more than 10 % of planned lending growth with SFF capital (see section 5.3.3).

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[34] In its 2009 annual report, the Norwegian State Finance Fund shows the estimated increase in Tier 1 ratio for all supported banks. These are the figures utilized in this regression.

[35] An endogeneity problem arises when one or more of the explanatory variables in the regression equation are correlated with the error term. These factors in the error term are unaccounted for in the regression and will cause any estimate to be biased (Wooldridge, 2009).

10.2.3 What would have happened to lending growth if the SFF were never created?

As important as asking what may have hampered the SFF's effect on lending growth, is asking what would have happened to lending growth if the SFF, or something similar, were never established.

Apart from the seeming positive effect of the SFF capital, are there other reasons to believe that the lending growth rates would have been lower without support? A survey on Norwegian banks' expectations of the effect of government measures conducted in 2009 sheds some light on this. 29 % of the banks in the survey respond that they expect their Tier 1 levels to lead to a tightening of lending policy. As it turns out, these banks had an average Tier 1 ratio of 13.3 % at year end 2008, whereas the ones responding the contrary had an average ratio of 17.2 %. These averages are significantly different from each other (Evanger & Thorud, 2009), as are the average Tier 1 ratios of the supported banks and the other banks in my sample (see appendix 2). Consequently, this is suggestive of a planned weaker lending growth for banks with lower Tier 1 ratios. Since the SFF capital infusions directly bolstered banks' Tier 1 ratios, this result can be used to argue that the supported banks' net lending growth rates would have been weaker than that of the other banks in the absence of support.

10.2.4 Did the SFF capital have any other effects?

Having a look at suggestive evidence of effects the SFF support might have had on other parameters than lending growth is interesting as well. Firstly, it seems clear that the savings banks would have been unable to issue equity or hybrid securities in the market due to a weary investor community, and the SFF capital did as such function as a bridge over dry capital markets (Sparebank1 SMN, Sparebanken Vest and Sparebanken Sør have all replaced the SFF capital with regular bond issues by now). As such, the SFF might have been the only solution for the banks to bolster their Tier 1 ratios (see Figure 7, section 7.3) at this crucial point in time.

Secondly, the supported banks' average deposit/loan ratio for 2010 is in incline and thus bears evidence of increasing deposit bases, since we know that the lending growth rate was no longer negative in 2010 (see Figure 14, section 7.7 and Figure 9, section 7.4). This is corroborated by the development in customer deposit growth, which is positive, if not as positive as for the other banks (see Figure 15, section 7.8). One might assert that increasing

deposit bases are due to depositors' confidence in the banks, and this development could potentially have been less emphasized in the absence of the SFF capital.

Thirdly, the supported banks' profitability improved more rapidly in 2010 than what was the case for the other banks (see Figure 16, section 7.9). This may have been reinforced by the government support since such additional capital relieves a bank of some pressure and lets it focus more on income-generating activities. However, this might be deceiving, as pre-loss profitability in 2010 is largely similar for SB and OB (see Figure 17, section 7.9). Additionally, pre-loss profitability improved for the supported banks in 2009, which actually suggests that a further improvement for 2010 may have been dampened by the SFF capital. Finally, the supported banks' cost/income ratio also saw a positive development in 2010, similar to that of the other banks (see Figure 18, section 7.10). As was the case for profitability, the SFF capital may have catalyzed such a development, but it may also have dampened a further decrease. The former seems more probable, however, considering the rather extraordinary development of the cost/income ratio in 2008.

10.3 Sub-conclusion

A potential explanation to my result not yet mentioned is a prevailing self-selection bias. This is to say that the model may fail to account for self-selection bias, despite the precautionary specification described in section 9.3.

Taking the above arguments and suggestive thoughts from all sub-sections into account, there are some conclusions regarding the effect of government support to be made. The matching estimator estimates a positive support effect of 4.51 percentage points on change in net lending growth between 2008 and 2010, which implicates that the hypothesis – *The capital allocated by the State Finance Fund has had a positive effect on the supported banks' net lending growth* – is confirmed. However, the result is robust to some but not all attempted robustness tests, and the question of whether the effect on lending growth could have been more accentuated remains open. Several mechanisms may have hampered the effect, at the same time as there is reason to believe that the lending growth for the supported banks would have seen a weaker development in the absence of support.

Lastly, aggregated data suggest that the SFF capital may have contributed to bridging the capital drought in the markets felt by the larger savings banks, as well as to restore investor and depositor confidence in the banking sector.

11 Comparison with previous Norwegian banking crises

This section will use the knowledge derived from the previous sections to embark on a comparison of government support during different Norwegian banking crises. As revealed in section 3, government support in times of crisis is nothing new in Norway. The Norwegian government did not participate actively in rescuing any banks at the beginning of the 20th century, but their role was central in keeping the Norwegian banking sector afloat both in the 1920s, the 1990s and most recently during the financial crisis of 2008 and 2009. Has there been a development from each crisis to the next with regards to how the government support is given? Has the objective of the intervention always been exactly the same? And lastly, is there a difference as to what effects the government support has had throughout the different crises? I will in the following paragraphs disregard efforts done by Norges Bank and focus solely on direct government support given to both commercial and savings banks.

11.1 Types of government support

The government support put in place during the 1920s consisted of NOK 15 million being deposited in private banks for liquidity purposes and NOK 50.7 million in subordinated loan capital allocated to two large commercial banks. Other than that, public authorities took over the administration of 66 banks between 1923 and 1928. In the early 1990s, the main government support was channeled through the Government Bank Insurance Fund (GBIF), which in total allocated NOK 16.2bn, and the Government Bank Investment Fund (SBIF). Additionally, a grant of NOK 1bn was given directly to the Savings Banks' Guarantee Fund. The two government funds allocated capital through various measures. The GBIF provided support loans to the CBGF and the SBGF, which in turn channeled this capital further to the banks. Moreover, it invested directly in bank shares, primary capital certificates and equity certificates. The SBIF participated in issued capital instruments such as preference shares and subordinated debt alongside private investors. Thus it seems right to conclude that the measures put in place by the government were broader during the 1990s compared to the 1920s. Also, the authorities took advantage of the presence of the banks' own guarantee funds, which did not exist in the 1920s. How does this compare to 2009?

The establishment of the Norwegian State Finance Fund and the Norwegian State Bond Fund bears resemblance to the GBIF and the SBIF of the 1990s. This time around, however, the

authorities chose not to channel the capital through the Norwegian Banks' Guarantee Fund (the result of a merger between the SBGF and the CBGF, see section 2.3), but rather let the SFF infuse capital to the total amount of NOK 4.1bn directly into the banks. As for the State Bond Fund, its investments in Norwegian financial institutions had a total market value of NOK 3.1bn at year end 2009 (Folketrygdfondet, 2009). There were no support loans from the government entities during the most recent crisis; all capital support was given as preference capital, hybrid capital or subordinated debt. Despite the larger amount of capital initially allocated to the SFF in 2009 (NOK 50bn) compared to the GBIF in 1991 (NOK 5bn), the actual amounts channeled to the banks differ inversely. As mentioned, NOK 16.2bn was the final amount distributed by the GBIF, whereas NOK 4.1bn was the case for the SFF. As we will see, this might be due to the different actual objectives of the two funds.

11.2 Objectives of government support

During the 1920s, the objective of government interventions seems to have been to protect financially sound banks from bank runs and subsequent insolvency while orderly winding down those that turned out to be inappropriately run. Furthermore, while the objectives of the GBIF of 1991 and the SFF of 2009 were similar in theory – restore market confidence in the banking sector and bolster banks' solvency in order for them to provide credit to the Norwegian economy – the realities of what they had to indulge in were two quite different ones. The GBIF (and the SBIF) actively participated in rescue missions to keep afloat several large banks which had had their equity completely depleted. This reflects the fact that the crisis in the early 1990s was indeed deeper than the most recent financial crisis with respect to the Norwegian banking sector. The SFF invested in banks for which the Tier 1 ratios were still at healthy levels at the time of support. Consequently, much less capital was needed, and no bank was ever close to having its equity depleted. The losses incurred were simply not comprehensive enough to pose such a threat, especially due to the availability of the SFF capital. As such, the GBIF and the SFF had the same theoretical objective, but in the end played different roles due to the difference in severity between the banking crisis in the 1990s and the financial crisis of recent years.

11.3 Effects on lending growth

Given the objectives of the government support in the 1920s as described above, the lending growth development might have been an objective of secondary importance; it was very

volatile for both commercial and savings banks throughout the entire period. The same was the case in the late 1980s. The two most heavily supported banks (Den norske Bank and Nordea) continued to see volatile lending growth rates mostly on the negative side all until 1995, whereas the average annual lending growth rate of the other banks increased to exceed 10% in 1992 before stabilizing at a slightly lower, but still positive level. Thus, it might be that the government support helped increase the lending growth rate, but it did not attain positive levels until around 1995 for Den norske Bank and Nordea.

This picture is somewhat different to the one I have depicted for the recent financial crisis. The banks supported by the State Finance Fund seem to attain higher lending growth rates than the other banks already in 2010, a result which might in part be caused by the capital received. In any case, my comparison shows that banks' lending growth rates have been severely affected during previous banking crises as well. Government efforts in the wake of the crisis in the early 90s did not promptly improve the subjected banks' lending growth rates, a fact which might also be explained by the severe state they were in. Thus, fairly similar policies do not necessarily generate the same results in different crises, a fact that should be taken into account by future policymakers.

12 Consequences for policymakers

So what to take home from this exercise? Having looked at descriptive statistics as well as conducted tests of econometric models, it is now time to draw up some potential consequences for policymakers based on the discussion in section 10.

The government sought through the Norwegian State Finance Fund to restore investor confidence in the banking sector and help banks sustain sound lending growth rates. The SFF did not succeed completely to the extent predicted, as they forecasted a weighted average lending growth rate of 6.52 % for the supported banks in 2010 whereas the actual figure turned out to be 4.26 %[36]. My estimated effect on change in net lending growth between 2008 and 2010 of 4.51 percentage points corroborates these figures, even though my result is rendered insignificant when eliminating the two largest supported banks. The SFF capital further seems to have functioned as a bridge for some banks when the capital markets dried out, and one might also assert that investor confidence and depositor confidence was reinforced by the SFF. However, evidence of further effects is purely suggestive.

On a general level, it seems safe to conclude that the State Finance Fund had a role to play in 2009. On the other hand, exactly how important this role was is not certain. My analysis suggests that the supported banks are better off than they otherwise would have been, but most of them might have made it fine even without support. Their Tier 1 ratios prior to support were not as elevated on average as the other banks, but it was still not dangerously low for many. For some, however, like Sparebanken SMN and Sparebanken Vest, the support might have been crucial. They were the two banks with the lowest pre-support Tier 1 ratios among the supported banks, and also the two largest. My estimated effect of the SFF capital on lending growth is no longer significant when these two are taken out of the sample. This leads me to assert that the capital infusions done by the SFF were more important to some banks than to others.

According to the SFF, its forecast on improved lending growth is based on reported planning from the banks, which means that the banks have been overly optimistic when estimating

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[36] Weighted average net lending growth for 2010 for the supported banks in the sample. Gross loans as weights.

future lending growth. Moreover, the roof of 10 % of lending growth to be financed by SFF capital did probably not further catalyze the banks' efforts to increase their lending.

Consequently, the policy lesson to extract from this is twofold. Firstly, perhaps the most important policy feature of such a fund as the State Finance Fund is its blunt presence. This assures investors and depositors that banks have access to funding if needed. Secondly, since my results suggest that the effect on lending growth has been insignificant for many banks, future policy should consider stricter rules governing the allocation of financial government support. As politician in a country with Norway's fiscal position, it might be tempting to be less critical as to which banks are supported, under the parole "better a bit too much than not enough". That may be right at times, but being the recipient of government support is naturally not costless, as discussed in section 5.3.3. Although difficult, policymakers should therefore strive to find the balance of supporting those banks who really need the capital, and for whom it will spur an increase in lending growth (since that is the objective), while not supporting banks who simply want to be on the safe side.

As a result, the Norwegian government was right in establishing the Norwegian State Finance Fund in 2009, albeit perhaps with too great expectations for the direct impact on lending growth and with a potentially too loose policy for allocation of capital.

13 Conclusion

Working on this thesis has been at once interesting and challenging. Little research has been carried out pertaining to the Norwegian savings bank sector after the financial crisis, and so taking a first glance at the data from 2009 and 2010 was quite an inspiring exercise. As many previous program evaluation studies, I have made use of a matching estimator as the principal econometric method. The implementation of this and the choice of variables can always be discussed, but my result nevertheless suggests that the capital infused by the State Finance Fund may have contributed to improving the net lending growth rates for the supported banks, albeit not to the extent expected. However, the very presence of the State Finance Fund was in any case far from futile, as it played an important role in restoring investor and depositor confidence in the savings bank sector as well as bridged some of the larger savings banks over a period of drought in the capital markets.

Thus, future government policy in similar situations should take into account that higher lending growth is not simply a mechanic consequence of higher capital levels, although there most certainly is a connection.

13.1 Further research

The impact of financial government support in times of crisis is both an interesting and important field of research to which more resources should be devoted. A place to start could be a more in-depth analysis of some or all of the banks that chose to obtain capital from the State Finance Fund in order to qualitatively conclude on which factors played a role in the decision process. Also, research on the importance of amounts of capital could be fertile. Moreover, given the data made available by the Norwegian Savings Banks Association, with balance sheet data, profit- and loss-statement data and key performance indicators from 1995 and until today, further knowledge pertaining to a more long-term development in the savings bank sector could be extracted. Similar to the State Finance Fund, the Government Bond Fund invested capital in Norwegian banks in 2009. An analysis of the effect of that fund's investments could also be undertaken. Further to this, three savings banks received capital from both funds. Research on what was particular about their situations and why more banks did not do the same would be interesting. These are all issues that should be subjected to further research.

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Appendix 1 – Model adjustment and tests for robustness

This section contains the propensity score graphs for the individual variables used in models M1-M4. Furthermore, the results from exclusion tests on model M1 is reported, as well as the results from sensitivity tests on the specification of number of matches for model M1.

A1.1 Propensity score graphs for individual variables

The propensity score graphs are obtained by running Stata's command psmatch2 with Change in net lending growth 2008-2010 as dependent variable and each variable as sole matching variable. Number of matches is set to three.

Figure 25: Propensity score graphs for Write-downs and Net lending growth.
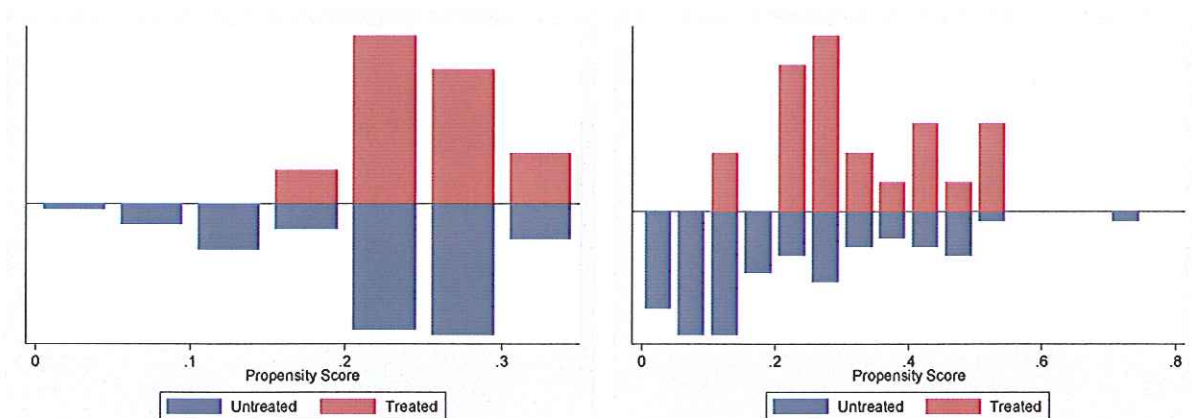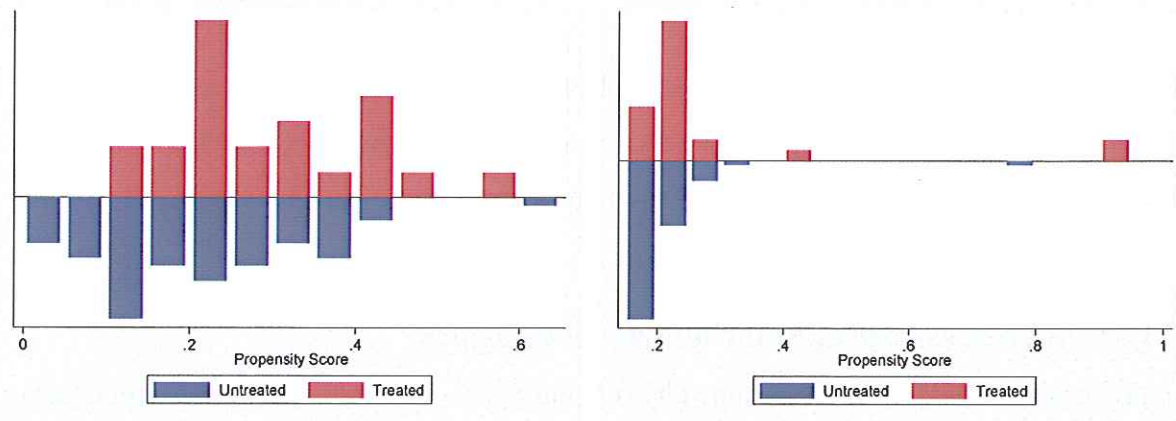

Note: Write-downs/Gross loans 2007 (left) and Net lending growth 2007 (right).

Figure 26: Propensity score graphs for Pre-loss profits and Cost/income ratio.
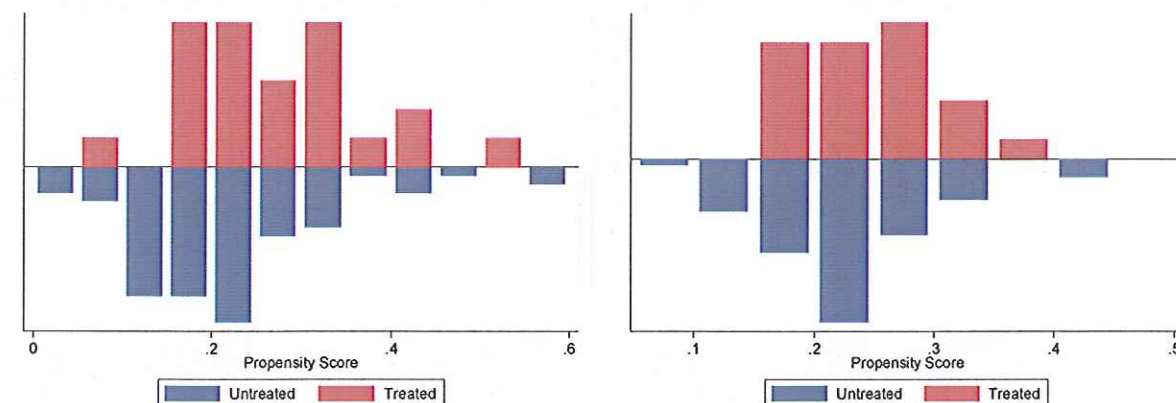
Note: Pre-loss profits/ATA 2007 (left) and Cost/income ratio 2007 (right).

Figure 27: Propensity score graphs for Deposit/loan ratio and Depreciation of fixed assets.

Note: Deposit/loan ratio 2007 (left) and Depreciation of fixed assets 2007 (right).

Figure 28: Propensity score graphs for Losses on loans and guarantees and Tier 1 ratio.
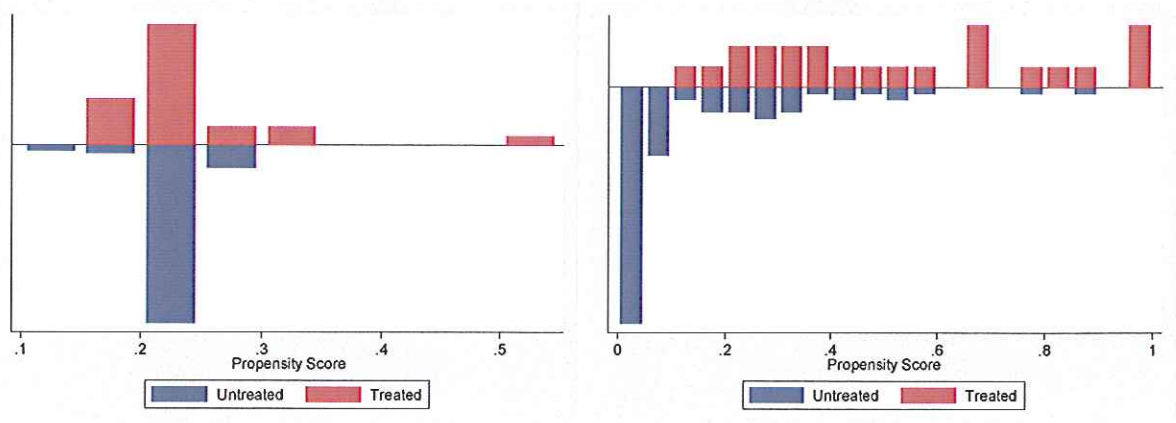
Note: Losses on loans and guarantees 2007 (left) and Tier 1 ratio 2007 (right).

Figure 29: Propensity score graph for Customer deposit growth and Average total assets.
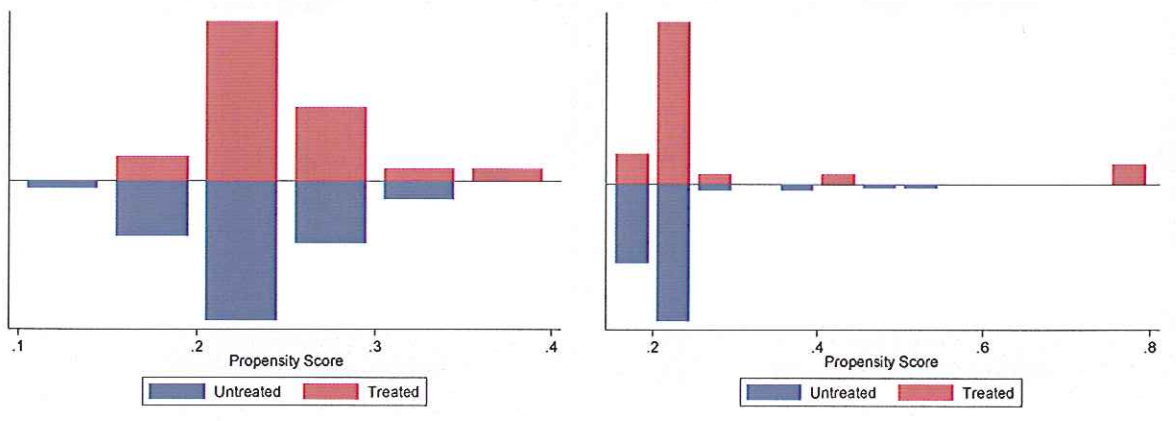
Note: Customer deposit growth 2007 (left) and Average total assets 2007 (right).

A1.2 Exclusion tests of final model

The results from exclusion tests done on model M1 are reported below. These tests are useful in order to see what effect each variable has on the full model. Table 6 shows that the exclusion of each variable renders the model less significant. However, although varying to some extent, the estimates do not alter the general picture; all coefficients are positive.

Table 6: Exclusion tests of final model M1.

	(1) Full model M1	(2) Write- downs/ gross loans	(3) Pre-loss profits/ ATA	(4) Cost/ Income ratio	(5) Deprecia- tion of fixed assets	(6) Net lending growth
SATT	4.51**	2.94	4.05*	5.19*	2.79	1.44
	(1.59)	(1.99)	(1.62)	(2.13)	(1.75)	(1.56)
Observations	100	100	100	100	100	100

Standard errors in parentheses
$^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Note: Each model from (2) to (6) is the full model M1 excluding only the variable indicated.

A1.3 Sensitivity tests of number of matches

Table 7 shows the results from running sensitivity tests on the number of matches to include in the final model M1. Several specifications yield a significant result. However, the estimation with three matches gives a significant result while producing the lowest standard error, and does seem to be the option that includes a sufficient amount of information and at the same time does not include too dissimilar matches.

Table 7: Sensitivity tests of number of matches.

	1 match	2 matches	3 matches	4 matches	5 matches	6 matches	7 matches
SATT	3.28	4.39*	**4.51****	3.29*	3.52*	3.76*	3.91*
	(2.44)	(1.74)	**(1.59)**	(1.60)	(1.68)	(1.67)	(1.75)
Observations	100	100	100	100	100	100	100

Standard errors in parentheses
$^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Note: Each column corresponds to model M1 run with the indicated number of matches.

Appendix 2 – One-way analysis of variance on Tier 1 ratio

The result reported in Figure 30 shows that the mean Tier 1 ratio of the supported banks is significantly lower than the Tier 1 ratio of the non-supported banks on a 5 % significance level.

Figure 30: One-way analysis of variance. Tier 1 ratio.

Suppbank	Summary of Core Capital Ratio (%) Mean	Std. Dev.	Freq.
0	11.739647	8.7925558	231
1	9.0117252	6.637451	69
Total	11.112225	8.4148777	300

Source	Analysis of Variance SS	df	MS	F	Prob > F
Between groups	395.369836	1	395.369836	5.67	0.0179
Within groups	20776.8702	298	69.7210408		
Total	21172.24	299	70.8101672		

Appendix 3 – List of non-supported banks in the sample

Bank	Average total assets (MNOK) in 2010	Bank	Average total assets (MNOK) in 2010
Sparebanken Møre	41813	Arendal og omegn Sparebank	2213
Sparebanken Hedmark	41251	Hjartdal og Gransherad Sparebank	2060
Sparebanken Pluss	35089	Strømmen Sparebank	2063
Sparebanken Øst	22524	Hønefoss Sparebank	1992
Helgeland Sparebank	18542	Trøgstad Sparebank	2004
Fana Sparebank	12424	Stadsbygd Sparebank	2011
Sparebank 1 Nordvest	9860	Andebu Sparebank	1928
Haugesund Sparebank	6850	Ørskog Sparebank	1968
Sparebank 1 Søre Sunnmøre	6490	Sunndal Sparebank	1887
Spareskillingsbanken	6220	Bø Sparebank	1779
Nøtterø Sparebank	5733	Spydeberg Sparebank	1795
Sparebank 1 Hallingdal	5729	Klæbu Sparebank	1772
Jernbanepersonalets Sparebank	5633	Drangedal og Tørdal Sparebank	1678
Modum Sparebank	5365	Grue Sparebank	1632
Time Sparebank	5032	Aasen Sparebank	1574
Skudenes & Aakra Sparebank	4725	Bjugn Sparebank	1520
Melhus Sparebank	4358	Etne Sparebank	1577
Halden Sparebank	4234	Fornebu Sparebank	1537
Flekkefjord Sparebank	4119	Åfjord Sparebank	1479
Sparebank 1 Gudbrandsdal Fron	3756	Sparebanken Hemne	1380
Lom og Skjåk Sparebank	3447	Hegra Sparebank	1382
Odal Sparebank	3333	Evje og Hornnes Sparebank	1337
Larvikbanken Brunlanes Sparebank	3488	Ofoten Sparebank	1292
Sparebank Hardanger	3578	Valle Sparebank	1200
Askim Sparebank	3339	Rindal Sparebank	1180
Surnadal Sparebank	2933	Nesset Sparebank	1097
Orkdal Sparebank	2951	Birkenes Sparebank	1069
Søgne og Greipstad Sparebank	3107	Haltdalen Sparebank	1030
Marker Sparebank	2976	Vik Sparebank	925
Eidsberg Sparebank	2976	Tysnes Sparebank	892
Kragerø Sparebank	3004	Øystre Slidre Sparebank	783
Voss Sparebank	2708	Aurland Sparebank	736
Harstad Sparebank	2428	Vestre Slidre Sparebank	603
Luster Sparebank	2351	Lofoten Sparebank	531
Tolga-Os Sparebank	2251	Gildeskål Sparebank	510
Lillesands Sparebank	2287	Etnedal Sparebank	498
Opdals Sparebank	2269	Vang Sparebank	460
Meldal Sparebank	2195	Cultura Sparebank	402
Berg Sparebank	2146		