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# The Effect of Covered Bonds: High Encumbrance in Banks

*- A game changer for senior unsecured debt investors?*

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# Acknowledgments

This thesis is the final part of a Master of Science in Economics and Business Administration at the Norwegian School of Economics (NHH). The thesis is written within the specialisation area of Financial Economics, and is produced during the spring 2013.

During the fall of 2012, covered bonds caught our attention. A market three times the size of the Norwegian government bonds market and, until then, a market entirely unknown for us. Further reading made us realize how relevant covered bonds are for the economic and political events in Norway and the EU. Even so, gathering information to write this thesis was a greater challenge than expected. Without the help of Ølver Hadeland and Jonas Osland at Gabler, Fredrik Skarsvåg, Eirik Christensen and Øyvind Telle at Sparebanken Vest, this thesis would be completely different.

We also want to sincerely thank our supervisor Aksel Mjøs for always keeping us on our toes by questioning our logic.

## **Abstract**

This study examines the effect covered bonds have on the senior bondholders. We discuss how this new funding method is affecting the banks' balances and to which extent the senior bonds credit spread is influenced by different factors.

The results show that the senior bondholders and depositors are experiencing a much higher level of risk towards corporate loans than before the transfer of mortgages. This new risk is reflected in the increased credit spread for senior bonds. As banks continue to transfer more of their mortgages, so does the risk continue to increase. Our analysis of the senior bond credit spread shows that the return of equity (ROE) has a significant effect on the credit spread. We have found no evidence that size has an effect on the credit spread.

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# 2.   Introduction

## 2.1 Research Topic

We wish to study how the parent banks' balance sheet composition has changed since the introduction of covered bond companies and how it has affected owners of senior unsecured bonds. We also wish to analyse to what extent the financial markets is disciplining the banks which have encumbered their assets, and how they are disciplining the banks with respect to the remaining composition of the balance in the parent bank.

The research topic we wish to study in this paper is:

*"High encumbrance in banks – To what extent has the risk for senior unsecured bond holders changed with respect to the introduction of covered bond companies? And do investors in senior unsecured bonds discipline their banks with respect to encumbrance and the new composition of the balance sheet?"*

We wish to study the rate of encumbrance in the banks and the quality of the remaining assets. Further we want our analysis to include how the quality of the remaining assets is affected in the credit spreads of senior unsecured bonds. We will discuss the price changes of senior unsecured financing with respect to capital structure theory. We also want to look at the difference between senior unsecured bonds and covered bonds, and with regard to the differences discuss pros and cons for issuing covered bonds. To some extent we also want to analyse how establishing covered bond companies and issuing covered bonds have affected the overall pricing of bank funding and how this relates to basic capital structure theory.

Since covered bonds were introduced in Norway in mid-2007, many changes and events have occurred in the financial markets. Among the largest changes is the introduction of a new financial regulatory framework, Basel III. This framework contains new regulations which may affect both the banks and investors behaviour. Another of the largest events is the financial crisis of 2007-2009, and later on the euro crisis of 2011.

## 2.2 How the research is conducted

The research topic is approached with both quantitative and qualitative methods during the different steps of the research.

The first step in this research is to obtain quantitative information about the balance sheets, capital structure and risk profiles of the six banks included in this study. The main source for this information is the bank's respective annual and quarterly financial reports. When searching for information about a bank's risk profile we have used the banks pillar 3 documents in addition to the annual reports as sources. The information obtained are structured in time series, and these series will be basis for the quantitative research later in the study. The next step is to obtain prices of senior unsecured bonds and covered bonds from the financial markets. Since covered bonds were introduced in 2007 the time series obtained will be thereafter.

We do a panel-data regression analysis to study if the increased encumbrance and changes of the balance sheet has affected the market prices of senior unsecured bonds. Since the introduction of covered bonds in 2007, banks have experienced severe financial turmoil and changes in regulatory frameworks. We will need to adjust for this in our research and discuss our findings in relation to this.

We will also discuss our findings related to other factors that may have affected the findings in our analysis. Investor preferences, regulatory changes and political changes are among the factors that will be discussed. We will use analysis and commentary from different participants in the bank market as a source for criticism to our analysis. The relatively short history of covered bonds limits our analyses. Therefore we will emphasize on the discussion of our findings.

At the end we will discuss the future of senior unsecured bonds and covered bonds. We will highlight the factors that will play an important role of the future senior unsecured bond. We will also shortly discuss some future scenarios.

## 2.3 Research limits

This research touches many different subjects. In the financial markets, countless factors apply to the movements in market prices. Changes in financial, systemically, political and regulatory factors affects both the quality of one bank and the markets risk-appetite. To include these factors would be time consuming and complex. There is no right or wrong when estimating the credit spreads. We have therefore chosen to emphasize on the changes happening in the balance sheets of the banks and how that affects the risk profile for a senior unsecured bond holder. We will focus less on the pricing of bonds and the pricing of the different layers in the capital structure.

We have also limited our study to look at covered bonds and senior unsecured bonds. We will to some extent look at depositors risk since depositor holders with deposits greater than two million NOK have the same priority as senior unsecured bond holders in case of default. We have chosen not to look at the position of subordinated debt and equity holders.

We will go through the new regulatory framework and discuss how it may affect the composition of a bank's capital structure. However, we will not go deeply into the basis of the framework, and the foundation it is built on.

We also limit our research with regard to credit rating agencies. Credit rating agencies play an important role on the price of a bank's funding, whether it is the rating outlook on the economy or on a respective bank. However, to limit the scope of this assignment we choose not to focus heavily on changes in the credit rating.

## 2.4 Methodology

In this thesis we will conduct a case study on the establishment of covered bond companies and the increased use of them. The reason for why we choose to call this a case study is because we consider the establishment of covered bond companies and covered bonds to be an one-time event. When a bank encumbrance its assets it finally reaches a limit where it for several reasons not will be able to encumbrance more. We wish to study the case of increased encumbrance and compare the situation for senior unsecured bondholders before and after the encumbrance of assets.

A case study is considered to be a qualitative method. We collect documents and data that relates to our theme. However, the analysis also include simpler quantitative approaches, like regression and comparison analysis to analyse the effect of encumbrance.

The advantage of this method is that it gives us a granular understanding of this respective case. One of the disadvantages is that it is hard to generalize our findings. One cannot draw conclusions from this study over to similar cases in other business sectors or countries without adjusting for several factors (Gripsrud, Olsson & Silkoset, 2010).

## 2.5  Sources

Our primary source of information is the annual and quarterly reports provided from the banks. We also use their provided pillar three documents. First of all, these documents and reports provides us with the necessary data for our analysis. Second, they provide valuable information about the risks in banks, and how the risk is measured.

The Norwegian bond market is not very transparent and accurate market prices of funding has proved to be challenging to get. However, investment banks and brokerages have provided us with prices of funding that are representative for our sample of banks.

When finding information about the risk in banks and a bank's capital structure, the Bank for International Settlements (BIS) Basel Committee papers have been useful source. We have also used documents and papers from different central banks as frequent sources.

We have also found the public correspondence between the Norwegian Financial Supervisory Authority (FSA), the Central Bank of Norway and the Ministry of Finance as useful sources.

## 2.6  Structure of the paper

In the first part of this thesis we assemble a theoretical framework for basic capital structure theory. The next part is about the balance sheet for a bank, and more about why managing the balance sheet is most important part of a banks operation. We provide detailed information on the risks in banks, how they are measured and what we know about them. We'll also provide a short introduction to regulations.

In the third part we'll document the introduction of covered bond companies, and how they are established and related. We give a granular view of the foundation of these companies and reasons why they were established.

In the fourth part we discuss theoretically how the risk has changed for senior unsecured bond holders. We shows how the bank's balance sheets have changed as a result of this

In the last part, which contains the analysis and discussion, we compare our theory with what has happened in the reality and we discuss the findings in our thesis.

# 3.  Part 1: Theoretical Framework

## 3.1 Capital Structure theory

A firm's capital structure tells us how a firm finances itself and its operations. Simply put it is the right hand side of the balance sheet. The two main categories of the capital structure are equity and debt. We could also introduce hybrid capital. Hybrid capital is an element combinding debt and equity.  An example is convertible debt which is debt that will convert to equity if the firm reaches a certain value (Myers, 1999).

When analysing a firm's capital structure the most common thing review is the debt-equity ratio and the different types of debt a firm holds. It's common to separate between long term and short term debt, and between the different layers of debt. Some debt might have collateral, and will therefore require a lower interest rate than corresponding debt without collateral.

How a company chooses to finance itself depends on many factors. What line of business the company is in, what strategy it has and the price for different types of capital. Firms with low credibility often has several layers of capital and uses some of their assets as collateral for specific loans. Firms with high credibility often use fewer layers (Rauh and Sufi, 2010).

A firm has to pay a certain market price for the capital it holds. Equity holders will demand a certain return on their equity. This could either be paid out as dividends or as an increase in the firm value. Debt holders will demand interest on debt they provide. The sum of the return demanded from equity holders and debt holders is called the cost of capital (Berk and DeMarzo, 2011).

Following in this chapter we will look at different theories regarding the capital structure and the cost of capital.

## 3.2 The Modigliani-Miller Theorem

Modigliani and Merton Miller developed their model in 1958. The Modigliani-Miller theorem (M&M) is important part in modern finance theory and it has had a great influence in both financial research and practise. The theorem is built on two propositions and concerns a firm's capital structure and its cost of capital. Under the given assumptions the theorem states that

the firm value is not affected by the capital. The cost of capital for a firm will be equal for all debt-equity ratios (Myers, 2002).

The theorem is built on a number of assumptions for the M&M-theorem to hold. These assumptions could be summarized as perfect capital markets, rational investors and neutral taxes for firms/investors and debt/equity. Put more precisely the assumptions are as following (Berk and DeMarzo, 2011):

1. Investors must be able to trade firm's different securities at market prices which are equal to the present value of their future cash flows.
2. Symmetric access to finance markets. This means that investors and firms can borrow and lend at the same rate.
3. Capital markets are frictionless. This means that both debt and equity can be bought or sold instant and without any form of cost and spread. There are also no issuance costs for firms issuing debt or equity.
4. There are no taxes, or completely neutral taxes for both debt and equity among investors and firms.
5. There are no agency costs. The firm will always do what is best for the owners.
6. No costs related to bankruptcy.
7. A firms financing decisions does not change the future cash flow, and it does not reveal any new information about the firm.
8. An underlying assumption is how a firm handles excess cash. The excess cash will either be reinvested in a positive NPV project or be paid out as dividends. The cash will not be held in the firm or invested in negative NPV projects.
9. Asymmetric information. Both firms and investors always have the same information.

These assumptions are all relevant. At the beginning M&M also assumed that all firms needed to be a part of the same risk class, but Joseph Stiglitz discussed this in a paper from 1969. He argues that if several firms in the same risk class had the same value they would all be maximize the value and hence be in market equilibrium. It would not necessarily be an evidence of the M&M theorem (Stiglitz, 1969).

## 3.3 Trade off theory

From the Modigliani Miller theorem with taxes a firm would prefer to be 100 % financed with debt to maximize its value and minimize its cost of capital. This happens under the assumptions of perfect capital markets and no bankruptcy costs. In reality being a 100 % debt financed is difficult and would probably lead the firm in to financial distress. The trade-off theory argues that a firm would have an optimal capital structure at the highest possible leverage ratio, but still without letting the cost of financial distress getting higher than the benefits from the tax shield.

Financial distress occurs when a firm is close to defaulting on its obligations. When a firm goes bankrupt the debt holders takes ownership over the firm from its equity holders. In perfect capital markets this has no cost, but in reality the costs related to bankruptcy is significant to the firms' debt-holders. These costs can be divided in two parts. The first is the direct costs of a bankruptcy which is the costs related to the technicalities of a firm going bankrupt. Examples of this could be costs related to lawyers, bankers and other administrative fees related exchanging the debt owners to equity holders. The second one is the indirect costs. These costs are not directly related to the bankruptcy and might even occur before the company has gone bankrupt. An example of this is the loss of customers, reputation and employees.

In most situations there are in debt holders interest to not let the firm go bankrupt. Stewart C. Myers discusses this in a paper from 1984. He argues that the debt holders will take into account the costs of a bankruptcy demanding higher returns. A higher level of leverage will increase the chance of bankruptcy and will therefore increase the costs of debt.

The trade of theory combines the benefits a firm receives from its tax breaks on debt with the cost of financial distress. An increase in the leverage ratio will increase the tax benefits a company receives, but at a certain point, it will lead to financial distress which will increase the cost of debt. There are two main factors that determine the cost of financial distress. The first one is the probability of a bankruptcy. The second one is the costs that occur if the firm goes bankrupt.

The Trade of theory's valuation of a firm is based on Modigliani-Millers second proposition with taxes. This model implies that a firm reaches its capital structure with a 100 % debt financing. The Trade of theory adds the present value of financial distress into this equation. The firm value according to the Trade of Theory would then be:

*Formula 1 Value of a leveraged firm*

$$V_L = V_U + PV(TS) - PV(FD)$$

$PV(FD) = Present\ value\ of\ Financial\ Distress$

The firm will increase its value by adding leverage and increasing the value of its tax shield. But the present value of financial distress will also increase as the firm increases its leverage ratio. At a certain level the negative present value of financial distress will exceed the value of it's the tax shield, $\Delta PV(TS) < \Delta PV(FD)$, and the firm will lose value when adding debt. The optimal capital structure will be reached at the point where adding extra leverage would increase the cost of financial distress more than the benefits from the tax shield. This point would be at $\Delta PV(TS) = \Delta PV(FD)$. The present value of financial distress will be inelastic at low levels of leverage. But as the leverage increases the present value of financial distress will be more elastic and grow at a faster pace. This is shown in Figure 1.
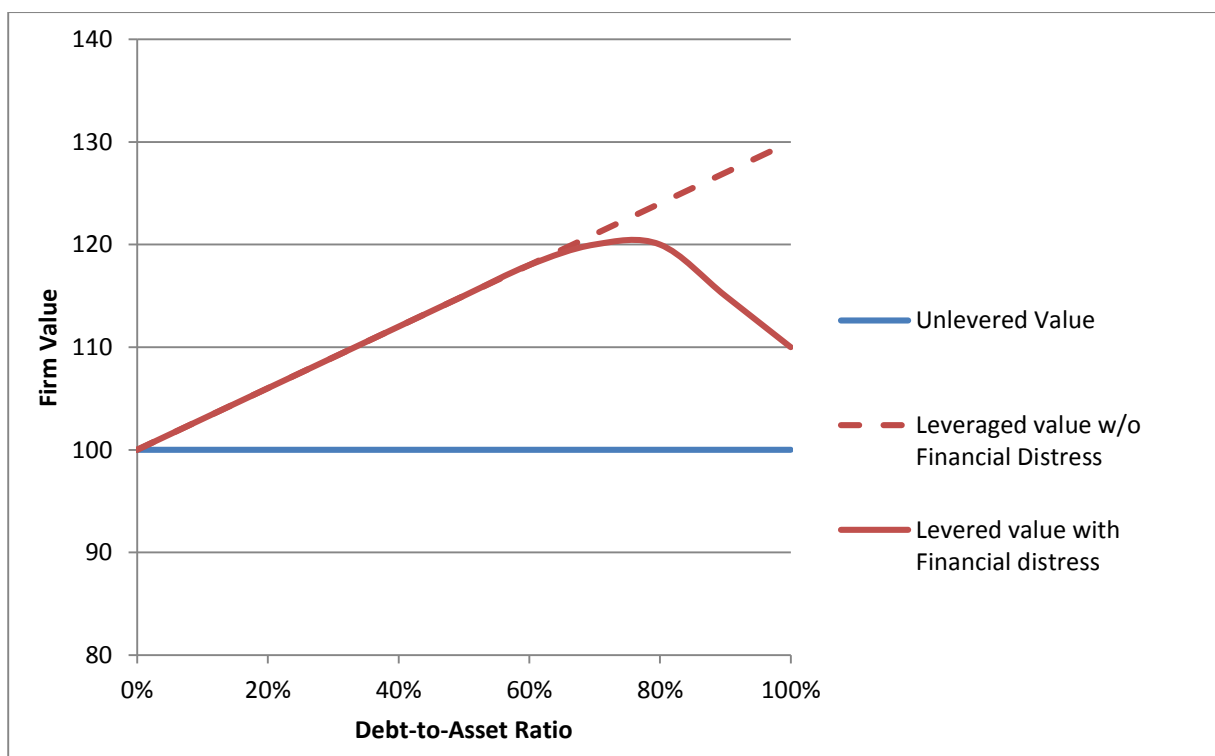


*Figure 1 Trade Off Theory, Value of a levered firm (Berk and DeMarzo, 2011). The figure shows that the firm value its highest at a debt-to-asset ratio around 75 %. The value of the firm will increase as the firm decides to increase its leverage ratio until about 75 %, after this level the total firm value will start to decrease.*

The trade-off theory is by many considered to be most popular theory to determine the optimal capital structure of a firm. Still, finding the optimal capital structure taking financial distress into account is difficult. There is no definitive optimal structure and structure will vary for different firms and sectors. Business cycles and financial turmoil also affects the financial distress.

Agency costs should be taken into account in the trade off theory. Agency costs occur when there is a conflict of interest between the equity holders and the debt holders. Especially when the risk of financial distress is high the equity holders of the firm, which also are the owners, could take risks that benefits the equity holders and disadvantages the debt holders. Sometimes changing the capital structure by adding more debt would increase the wealth of the equity holders but decrease the wealth of debt holders (Megginson, 1997).

## 3.4 Pecking order theory

One important assumption of both the Modigliani-Miller theories and the Trade-off theory is that they assume there is no asymmetric information in the markets. Myers and Majulf (1984) developed a model which states that a firm's capital structure was determined by the firms' need of capital. They assume that there is no optimal capital structure. They argue that a firm's management has an asymmetric information advantage above external investors.

In cases when this information is positive the firm will prefer to raise funds for new projects internally (reinvest free cash flow) because the financing raised externally would be mispriced (Donaldson, 1961). The external investor would have an information disadvantage and therefor require a higher cost for the capital it is providing to the firm than the firm is willing to pay. When there is asymmetric information and this "information gap" occurs it has an extra cost for the company. The difference between the price of equity and the price external investors require is called the cost of information.

Myers and Mjaulf further argues that a firms management always has an incentive to rise new equity when the price for the equity is low (e.g. the share price is high). The external investors are aware of this and will almost at all times underbid the initial offering price. And the cost of equity becomes more expensive than what the firm initially was willing to pay. This negative effect adds to the cost of information

Based on this argument, Myers and Majulf (1984) ranged different sources of funding. Financing rose internally will be the preferred source of funding. Internally there is no asymmetric information and they are able to choose the funding source where the opportunity cost is at its lowest. The same goes for external funding. This is often debt which has high collateral or high seniority. Ranged after this are unsecured sources of debt and hybrids. Financing by issuing equity is the least desired alternative. When issuing equity the cost of information could be high.

When Myers and Majulf (1984) developed this model they explained some real-world patterns they have observed in the financial markets. They observed that in almost every industry the most profitable firms have a relatively low debt ratio. This observation explains itself: For a company to be able to raise internal capital they have to be profitable. They also observed that firms which conducted leverage increasing events (like stock buy-backs) gave greater abnormal returns to equity investors, and that firms who conducted leverage decreasing events, like issuing equity, gave lower return to equity investors (Myers and Majulf, 1984).

## 3.5 The Expected Loss (EL) model

A bank uses several different approaches and models to calculate risk in a bank. To calculate credit risk, the risk of a default for a lender, banks most commonly use the expected loss model. As a bank never knows the losses it will suffer, calculating expected level of credit losses may be challenging. These losses are referred to as expected losses. These calculations are based on the probability of the losses, loss given a default and the exposure at default.

The expected loss model is simple. Expected loss is found by multiplying the probability of loss multiplied with the loss given a default, and the exposure at default

*Formula 2 The expected loss model*

$$EL = PD * EAD * LGD$$

$EL$ = Expected loss
$PD$ = Probability of default
$EAD$ = Exposure at default
$LGD$ = Loss given default

Since the exposure at default is given and known by the bank the expected loss would typically be expressed as a percentage of the exposure at default:

*Formula 3 Expected loss (given EAD = 1)*

$$EL = PD * LGD$$

The first step in calculating the expected loss is finding the probability of default. A default occurs if a borrower cannot completely meet its obligations. The longer the maturity on a loan is, the higher are the risk for a default. Table 1 show the cumulative probability of default on different company ratings[1] provided by Moody's in the time period from 1920 to 2011.

| Rating/Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Aaa | 0.00 | 0.01 | 0.03 | 0.08 | 0.16 | 0.24 | 0.35 | 0.50 | 0.65 | 0.83 |
| Aa | 0.07 | 0.21 | 0.33 | 0.52 | 0.80 | 1.11 | 1.44 | 1.75 | 2.05 | 2.39 |
| A | 0.10 | 0.30 | 0.61 | 0.95 | 1.31 | 1.70 | 2.12 | 2.54 | 2.99 | 3.44 |
| Baa | 0.29 | 0.86 | 1.55 | 2.30 | 3.09 | 3.88 | 4.63 | 5.40 | 6.21 | 7.03 |
| Ba | 1.35 | 3.26 | 5.43 | 7.68 | 9.81 | 11.82 | 13.67 | 15.50 | 17.22 | 19.01 |
| B | 3.89 | 8.88 | 13.91 | 18.35 | 22.25 | 25.70 | 28.88 | 31.55 | 33.92 | 36.03 |
| Caa-C | 14.25 | 24.07 | 31.49 | 37.16 | 41.72 | 45.11 | 47.68 | 49.99 | 52.26 | 54.27 |
| Inv Grade | 0.16 | 0.47 | 0.86 | 1.29 | 1.77 | 2.26 | 2.75 | 3.24 | 3.76 | 4.29 |
| Spec Grade | 3.87 | 7.91 | 11.78 | 15.22 | 18.24 | 20.87 | 23.23 | 25.35 | 27.29 | 29.16 |
| All rated | 1.54 | 3.17 | 4.75 | 6.16 | 7.41 | 8.53 | 9.53 | 10.45 | 11.32 | 12.17 |

*Table 1 The probability of defaults during the years 1920 - 2011 for all ratings (Moody's, 2012)*

Loss given default is calculated from the rate of loss the lender suffers in case of default. We could divide the loss given default into three main areas: The loss of book value, the loss of interest payments and costs occurred when the loss takes place (bankruptcy costs).

This model gives a bank an idea of the expected loss it will suffer in advance. The expected loss model have a close connection with the different interest rate margins on loans. The interest rate margin on a loan needs to be minimum the expected loss rate for a lender to reach a break even rate on the loan.

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[1] Ratings are based on several factors. Among these are financial solidity, economic and financial conditions in area of operations, etc.

# 4.   Part 2: Capital structure in banks

A bank is an institution whose main purpose is to be the intermediate between money savers and money borrowers. It accepts deposits from money holders and lends out to money borrowers. The banks play an important role in managing risk and redistributing short maturity funds from money holders to borrowers with profitable projects with longer maturity (Hoff, 2011). The banks have an important task in offering efficient and safe ways of making and receiving payments and reducing transaction costs (Norges Bank, 2004).

Banks are the only financial institutions who is mandatory to accept depositors from individuals (Meinich and Munthe, 2013). We can usually divide banks into either purely commercial banks or savings banks. A commercial bank is established like a corporation with shareholders while saving banks usually are fully owned by its own foundations. Since 1987 savings banks have been allowed to raise quasi-equity from private investors. The savings banks in Norway are still partly owned by its foundations, using profits for social causes in the societies in which they operates. After the savings banks were allowed to raise equity from external investors the difference between savings banks and regular commercial banks become smaller. We see that many savings banks have the same operational model as a regular commercial bank (Norges Bank, 2004)

In this chapter we will have an introduction to the financial system and the main responsibilities it has. We will look at how a bank operates and fund its operations. Further on we will go through some theories of the capital structure in a bank.

## 4.1 The Financial system

In addition to banks and financing corporations the financial system as a whole contains several different institutions. These institutions are insurance companies, investment brokers, investment advisors and of course the financial market. All these institutions are important intermediaries between money holders and money lenders. Funds money holders deposits or invests will give a return, by receiving interest, dividends or other kinds of return. The same way as borrowers of funds pay interest, commissions or return on equity on the funds they obtain. The flows between the different participants in the financial system are shown in figure 2.
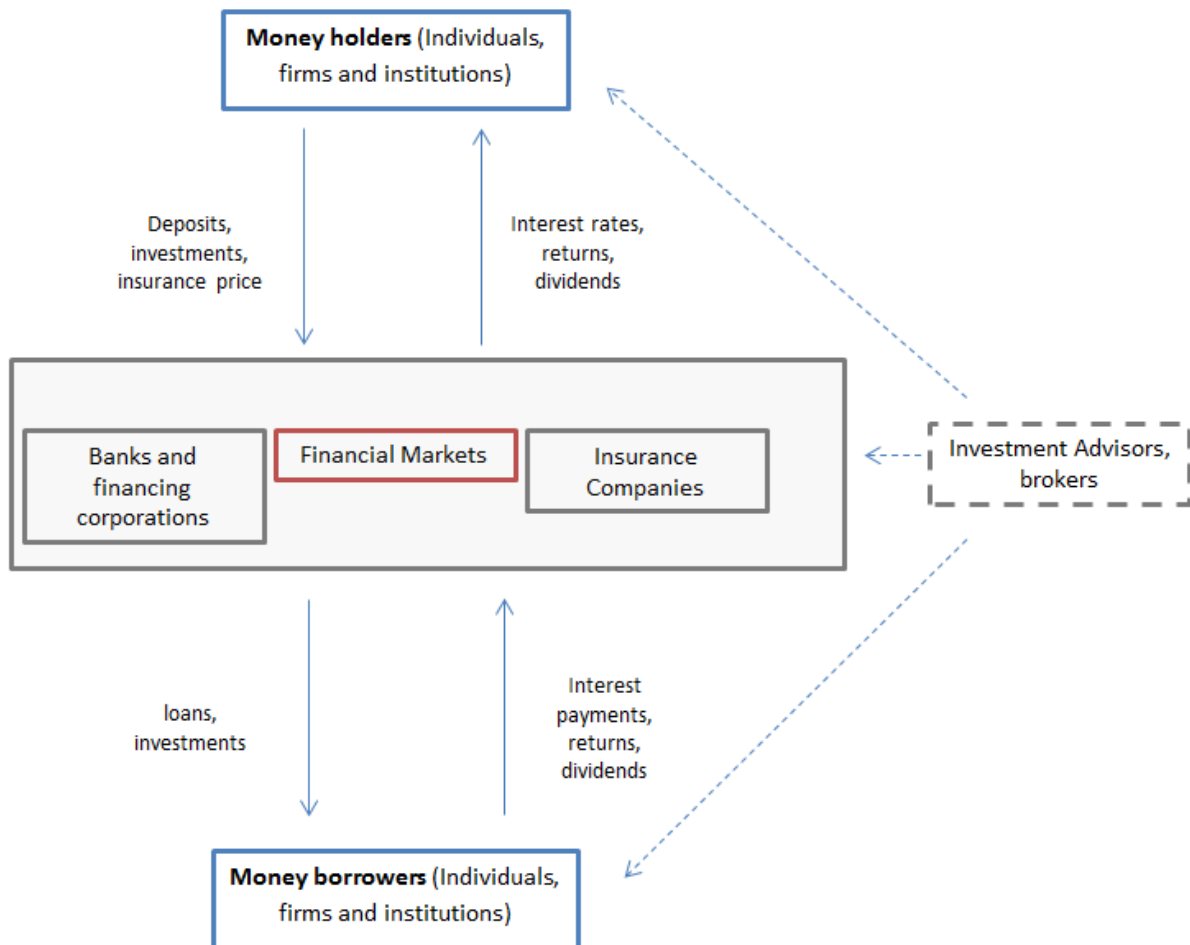
*Figure 2 The Financial system (Norges Bank, 2004)*

The financial system is in the middle being the intermediary between holders and borrowers. The different financial institutions also trade with each other's. The reason why pure investment brokers and advisors are on the "outside" of the financial system is that they do not take risk like the other parts of the system, they provide information and transaction services. They are an intermediary between the financial system and both lenders and borrowers. Investment funds do also play an important role in the reallocation of funds, but they are not classified as financial institutions.

In addition to being an intermediary between money holders and lenders the financial system also has several other responsibilities.

**Linking and transforming different maturities and amounts** is a factor when putting borrowers and lenders together. The amount of money and the maturity desired mismatch between lenders and borrowers. A borrower usually wants larger amounts and longer maturity

than a single lender is willing to supply. Banks play an important role here, as many money lenders deposit small amounts with short maturities, while borrowers often lend at longer maturities and bigger amounts. The total balance sheet of a bank often has a longer maturity on its assets than on its funding (Hoff, 2011).

**Managing and pricing risk** is an important task for the financial system. The different financial institutions have an essential role in evaluating different business projects and different borrowers. Financing profitable business projects and good business ideas access financing is not only important for borrowers and lenders, but also the main contributor to global economic growth and welfare. The financial markets also price these projects and the risk involved efficient and fairly (Norges Bank, 2004)

The financial system contributes to **reduce concentrated risk.** An example of this is an insurance company insuring houses or firms. The customers pay a price to insure an object and it is in the insurer's responsibility to be an intermediate between all the customers. It is also their responsibility to price and guarantee for the objects insured. Securitization of business projects and loans also contributes to reduce risk. An investor with limited funds available is able to diversify investments in different projects and businesses either it is in equity or debt investments.

**Reducing transaction costs and making an efficient and transparent market** is substantial for the financial system. It is in the best interest for both borrowers and lenders to use limited funds and resources on transaction between them go easily (Norges Bank, 2004).

The Financial Supervisory Authority (FSA) of Norway is responsible for the supervision of the financial system. It promotes financial stability and orderly market conditions (Finanstilsynet, 2013). The monetary policy is decided independently of the central bank of Norway (Norges Bank). They also act as a settlement bank and ensure that there is a reliable amount of liquidity in the Norwegian bank market (Norges Bank, 2012)

Having a functioning, rational and stable financial system is an important part of a stable and effective economy. Further we will look at the banks and how the capital structure of a bank is composed.

## 4.2 The Bank Balance sheet

How a bank chooses to finance itself and how it operates is shown through its balance sheet. A banks balance sheet distinguishes itself from other firms. It holds a significant amount of loans on the asset side and deposits/funding on the equity and liability side. One important operation of a bank is managing their balance sheets. A bank's main task is ensuring that the assets have a higher rate of return than the cost of its financing. This is called the net interest income and is the most important source of income for a bank (Diamond and Rajan, 1998).

A huge part of the balance consist of deposits and lending from clients, being an intermediary between money holders and the profitable projects of a moneylender (Hoff, 2011).

Figure 3 describes a typical Banking balance for a Norwegian bank at the year end of 2011.
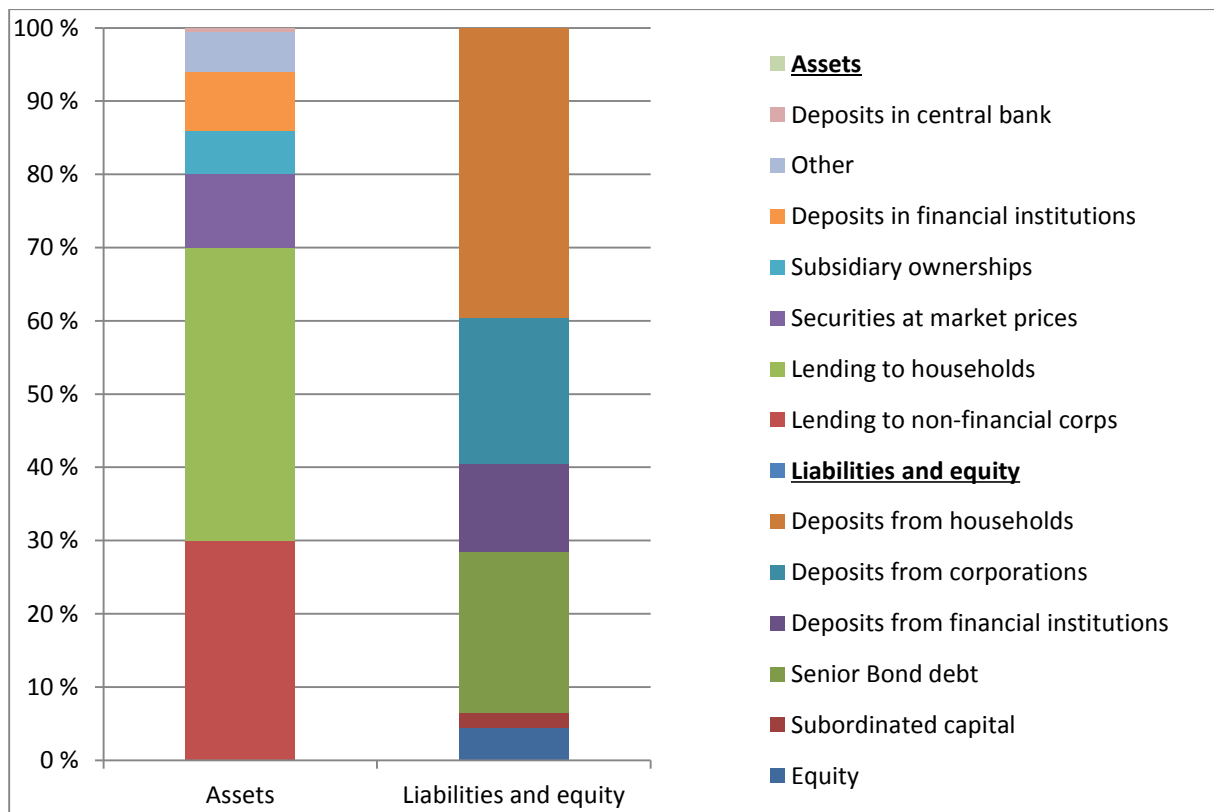


*Figure 3 Composition of a bank's balance sheet (Hoff, 2011)*

## 4.2.1 Left hand side: Assets

A bank's assets are often referred to "total assets", which is an important measurement of how big a bank is. A banks assets is not similar to those in an industrial firm. It does not contain large amounts of fixed assets like machines or buildings. The fixed asset a bank holds are often no more than its headquarter and its inventories. The assets consist mostly of loans to clients and reserves it needs to hold to manage it day to day operations. The composition of the assets tells us a lot of the amount of risk a bank is taking and how much return we can expect from it. A bank's assets are usually divided by how liquid they are but they can also be divided by how much risk they are associated with.

In terms of liquidity, a bank's assets can be divided into two parts. First we have all the liquid assets, these are deposits in the central bank, securities like government- bonds, certificates and other highly rated bonds. The illiquid assets are lending to clients and fully owned subsidiaries. Liquid assets are associated with lower risk than illiquid assets. They usually give a lower risk adjusted return than illiquid assets due to a liquidity premium.

*Liquid assets, reserves and securities*

The most liquid assets are the overnight deposits in the central bank. This is a part of a bank's reserves. The banks are required to deposit a certain amount of cash to the central bank overnight. The reason for this requirement is that the banks must hold a minimum share of liquidity and be able to manage its day to day operations. The required deposits are also an important part of the implementation of the monetary policy. The interest paid on the deposits in the central bank is equal to the targeted interest rate. By doing so the central bank is able to hold its short term rates at a desired level. Deposits in the central bank do not affiliate with any risk (Bernhardsen and Kloster, 2010).

As a bank is required to hold a certain amount of cash in the central day each day it may have an excess amount and some days come in short. When this occurs the financial institutions lend to each other in an overnight market. The rate on these deposits is calculated between the banks each day and is affected by the amount of liquidity in the market. The rates are approximately equal to the targeted rate from the central bank.  These deposits are traded each day and are therefore as liquid as the central bank deposits. However, they are not classified as reserves. These deposits are considered low risk, but as you lend to a second bank there is

always a risk involved that the bank is not able to honour its obligations. This is called counterparty risk (Goodhart, 2004).

Among the banks liquid assets are traded securities. These securities are government bond and certificates which is seen as the liquid asset with highest quality and corporate or covered bonds rated at an AA- grade or better (BIS, 2008).

A bank can also hold amounts of liquid securities for trading or market making purposes. When trading, a bank will hold securities for the sake of its expected return, and the return comes from taking risk. This is considered a risky operation for banks. Norwegian banks holds low trading positions relatively to international banks. For a bank that has a market making purpose the expected return will come from being both a buyer and seller of the same securities, and the bank will earn the spread between the buy and sell side minimizing searching and transaction costs. Market makers whose only purpose is to make effective markets tries to hold neutral positions and a low risk profile, however market making can be affiliated with some degree of risk.

## Illiquid assets, lending

The majority of a bank's assets are its lending to clients. Lending gives the largest share of interest income. A bank divides their lending into lending to households and lending to corporations. It also lends to other financial institutions. These loans do have shorter maturities and is a part of the liquidity management in the short term.

Lending to households mainly consist of mortgage loans. These loans account for around one third of Norwegian banks assets. Mortgages loans do often have a long maturity and are quite illiquid. Relative to corporate lending are lending to households affiliated with low risk. Both the banks itself and Basel regulations consider both with a higher probability for loss, and a higher loss given default for corporations (Norges Bank, 2012). A reason for this is because most loans to households are backed by high levels of collateral due properties taken in pledge.

Lending to corporations is more complex. These loans typically have a shorter maturity than lending to households. Many loans are not backed by any collateral and are therefore seen as more risky. Many of the loans have covenants which give the lender rights in case of events where the probability of default increases and the loans get more risky (GARP, 2013).

As financial institutions lend to each other overnight, they also deposit each other's assets on maturities longer than a day. They do this by either buying certificates from each other or lending directly to a counterpart bank. This trading is done in the money market. The money market is also open for larger industrial investors and public institutions like municipalities. However, the banks play the most important role in the money market and are crucial for the liquidity management of financial institutions (Norges Bank, 2004).

### *Other assets, subsidiary ownerships*

A bank often holds other assets on its balance. These assets can be ownerships in real estate brokerages, leasing companies, insurance companies or other financial institutions. The value of these assets accounts for a small part of the total assets.

## 4.2.2 Right hand side: Liabilities and equity

How a bank chooses to finance itself is an important part of its strategy. A bank usually holds a lower equity ratio compared to other industries. At year end of 2011 the six largest Norwegian commercial- and savings banks held an average of 5,7 % equity (Norges Bank, 2012). It is common to divide a bank funding sources between deposits from clients and wholesale funding. Wholesale funding is also known as market funding, issuing securities in the financial market. When managing the different sources of funding one can typically divide between short term funding and long term funding. If a bank finances it operations with a long average maturity the bank will be more robust during financial turmoil. In case of financial turmoil market funding can be difficult possibly leading a bank to distress (FSA, 2012).

Since the different sources of funding has different prices funding decisions directly affects the profitability of the bank. Having an optimal capital structure is therefore balancing costs and risk. Having a high level of risk could be crucial in periods with financial turmoil and mistrust in the banking system (Mishkin & Eakins, 2009).

*"A bank lives on credit. Till it is trusted it is nothing; and when it ceases to be trusted it returns to nothing"*

– Walter Bagehot (1826-77) Philanthropist, Banker and Editor of the Economist

Figure 4 shows what constitutes the capital structure of a Norwegian commercial or savings bank. Further in this chapter we will look at the different sections of the balance.
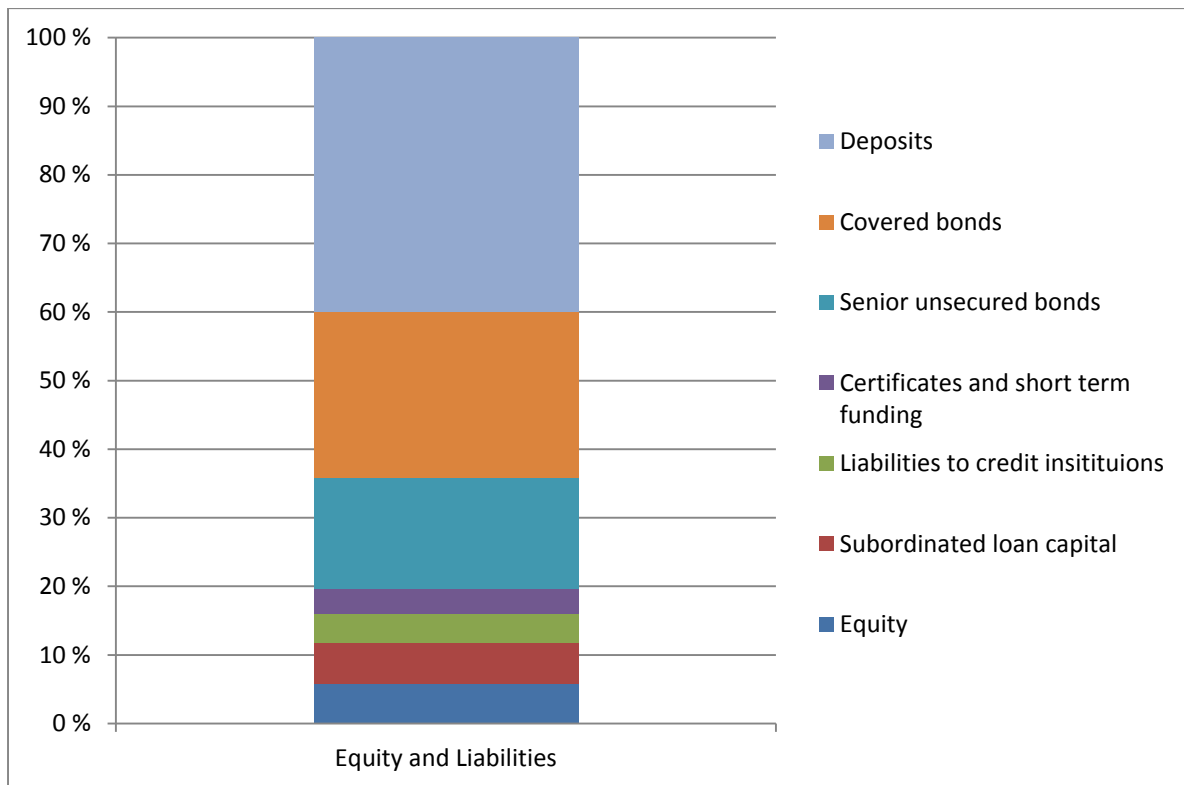
*Figure 4 Capital structure of a large Norwegian bank (Hoff, 2011)*

## Common Equity - Equity and subordinated capital

Equity counts for a small portion of the total capital. The share of equity in a bank has historically been a measurement for how solid a bank is. However, research has proven that other measurements are well as important measuring banks strength[2] (Kuritzkes and Schuermann, 2008).

Commercial banks increase equity trough issuing shares and retaining profits. A savings bank also raise equity trough issuing shares and retaining profits. Savings banks have historically have been owned by the society which it operates in. The primary fund is the society's share of ownership in a saving bank. However, if a bank is to raise equity through a share issuance the primary fund are unable to participate and will be diluted as an owner over time (BIS, 2010).

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[2] In "What we know, Don't know and cant't know about Bank risks: A View from the Trenches" Andrew Kurtzkes and Til Schiermann (2008) argues that other measurements than capital levels are important in a bank.

Subordinated capital is debt raised through hybrid securities. These securities have the same characteristics as a bond and are traded in the same way. The interest rate on subordinated debt bond may be divided in to two components. The first component is the market rate. For a floating variable bond this is expressed through the short term interest rates. In Norway the reference rate to a short term market rate may be the 3 month NIBOR[3]. For a fixed coupon bond this is expressed through the interest swap rate[4].The second component is the credit spread. This is an issuer specific margin required by the market for taking the risk involved in holding a subordinated debt (Raknerud, Vatne & Rakkestad, 2011).

A special feature of the subordinated debt is the ability a bank has to withhold the interest payments without defaulting on the loan. A large share of the subordinated securities are perpetual, but are able to be called by the issuer at regular intervals.

Subordinated capital could be divided into two types of capital. This is tier one and tier two capital. Tier one capital is subordinated to all other creditors of the bank, perpetual and could maximum be called after five years. The issuing bank is also allowed to cancel interest payments at any time with full discretion. However, market discipline will play an important role. If a bank chooses to withhold interest payments it will send a negative signal to the financial markets and in the worst case lead the bank into financial turmoil. Tier two capital is also subordinated to a banks general creditors and depositors, but senior to tier one capital. Tier two capital may have a minimum maturity or callable date after five years. A bank is not allowed to stop paying interest rate on tier two capital (BIS, 2011).

Equity and subordinated capital are loss absorbing sources. In case of a default the equity holders will be the first to take a loss. The subordinated capital will be the second source. Subordinated debt would not be paid until after the senior debt holders and depositors are paid in full. When measuring capital levels in banks equity and subordinated capital are often added and referred to as the total capital adequacy.

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[3] The NIBOR – Norwegian Interbank Offered Rate – A rate Norwegian banks daily reports to the Central Bank of Norway. The rate is supposed to reflect what rate a named bank is willing offer to lend to other named banks in the market. This rate lays as an reference rate for floating rates in both interbank trading and the bond market (Norges Bank, 2009).

[4] An interest rate swap is a financial contract where two parties decide to exchange interest rate payments for a fixed maturity. One side party pays a fixed rate, the other party pays a floating rate. The fixed rate is the reference rate for given maturities. These contracts are traded daily and reflects  what rates the market requires for fixed maturities at any time.

Equity and subordinated capital are the most expensive sources of capital. A bank will therefore weigh the cost of equity and subordinated capital against the safety it provides for the credit holders. Given a constant result higher ratio of equity will lower the rate of return on the equity but it will provide a lower risk (Mishkin & Eakins, 2009).

## Market financing - Senior unsecured bonds

Market financing has over the past years become an important source of financing for Norwegian banks. The banks total assets have grown faster than the deposits which have led to an increased use of alternative sources of funding. As shown in figure 6, the market financing as a share of total financing has risen over the last 30 years. The maturity of market financing can vary from one day to several years. However, most market financing have a fixed maturity and does therefore give predictability in managing the capital structure (Norges Bank, 2012).
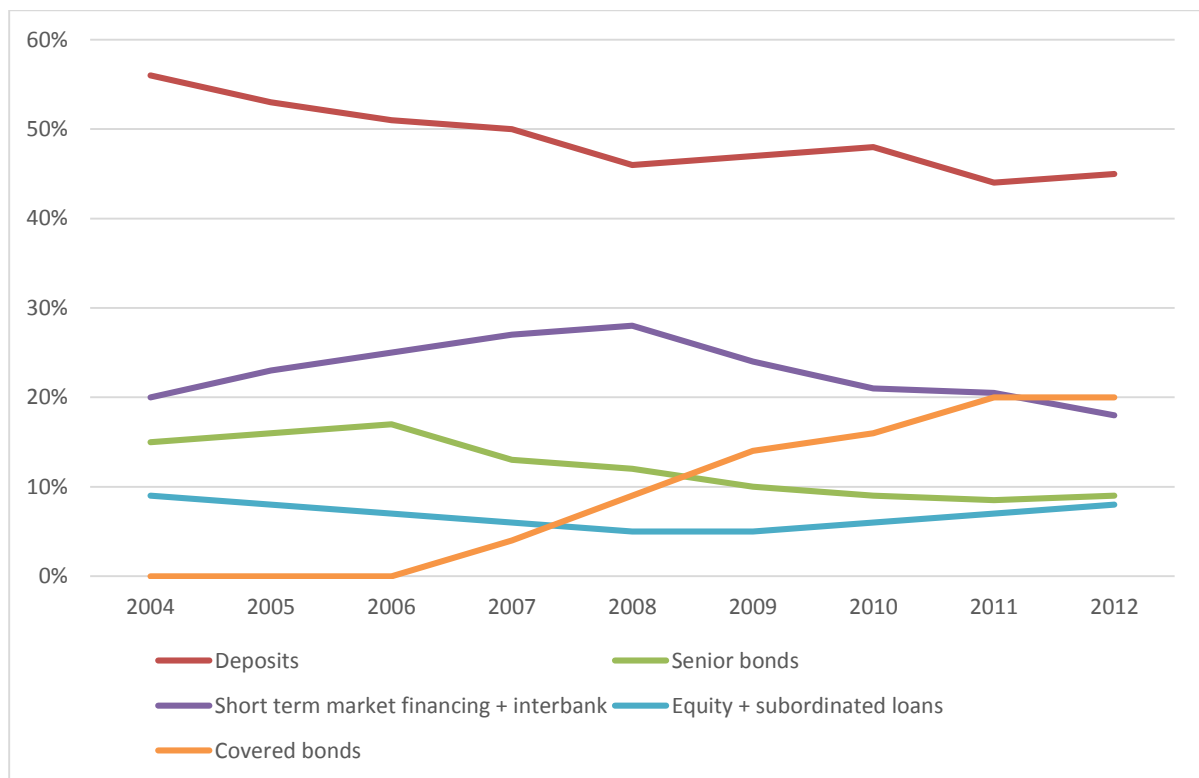


*Figure 5 The different types of funding for Norwegian banks 2004 - 2012 (Balterzen, 2013)*

When a bank provides loans to households and corporations the marginal funding sources are often funds raised in the capital markets. As a bank experiences a rise in demand of loans it may be hard to cover all the demand with an increase in deposits. Additionally it will be difficult to attract new depositors over a short period. To cover the higher demand a bank will

therefore raise funds through the financial markets. This leads to a correlation between share of a bank's market funding and the demand for loans (Raknerud, Vatne & Rakkestad, 2011). In figure 6 this is especially shown in the period of the late 1980's and early 1990 are where the Norwegian economy suffered a significant downturn and the demand for new loans where low. Some of the decrease in market financing is also due to nationalization of banks during the Norwegian bank crisis in the early 1990's (Gram, 2011).
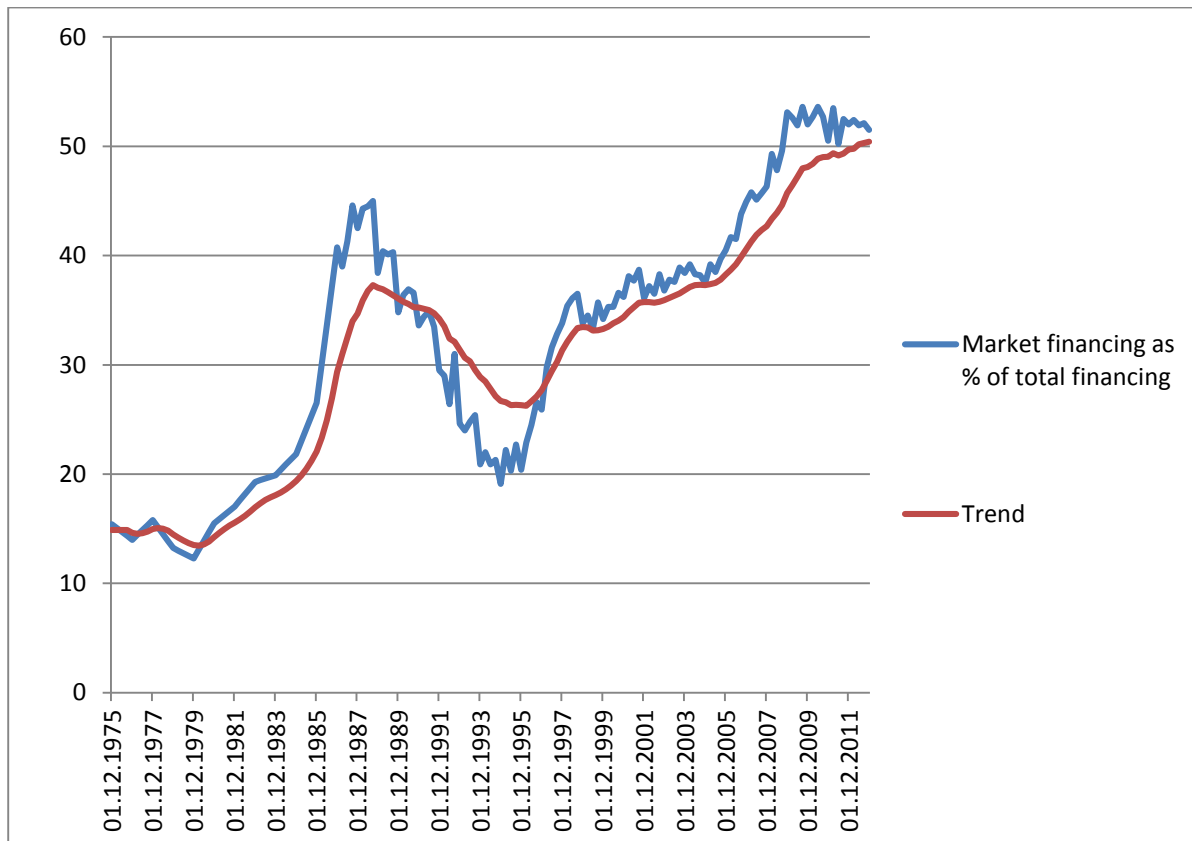


*Figure 6 Norwegian Banks Market financing as percent of total financing (Norges Bank, 2013)*

Senior unsecured bonds have historically been the main source of market funding for a bank. These bonds are regular bonds issued by a commercial or savings bank. The bonds are not backed by collateral of any kind, but have a higher seniority than subordinated capital in case of a default. Senior unsecured bonds are issued with either a fixed rate or a floated variable rate. A bank chose fixed rate or variable rate based on its risk preferences. The interest rate on a senior bond may, as the rate on a subordinated bond, be divided into two components. The first component is the market rate. The second component is the credit spread. This is an issuer specific margin required by the market for taking the risk involved in holding a senior

unsecured bond (Raknerud, Vatne and Rakkestad, 2011). As the senior secured bonds have seniority over subordinated bonds, the credit margin required by the market is lower.

The maturity on senior unsecured bonds typically lasts from 3 years to 10 years, with an average maturity on five years. Most Norwegian issue bonds in Norwegian Kroners – NOK. The largest commercial banks issue bonds in currencies such as the euro, Swedish krona or the US dollar as well. However, in periods with substantial financial turmoil even the largest banks find it difficult to raise senior unsecured bonds in the financial markets (Norges Bank, 2011).

Figure 7 shows the average interest rates and credit spread on a Norwegian large sized rated savings bank. Even though the money market rate has a large impact on the rate of senior unsecured bonds, one can see that credit spread is affected by financial turmoil and economic uncertainty.



Kilde: Makrobond/Sparebanken Vest/Nordea Markets
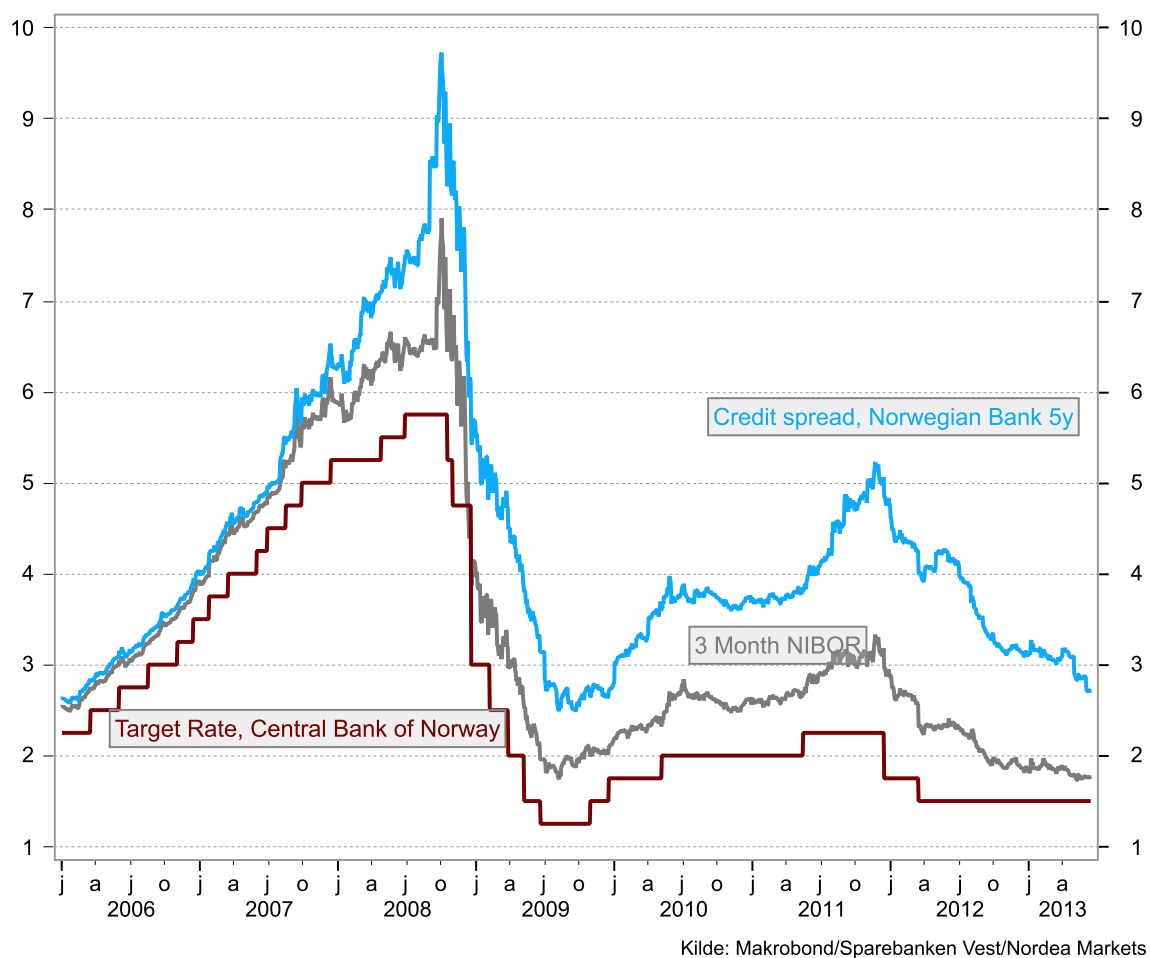
*Figure 7 Credit spread in Norwegian Bank, money market rate and targeted rate from the Central Bank (Sparebanken Vest, 2013)*

## *Market financing – Covered bonds*

Since the establishment of the Norwegian covered bonds market in 2007 have covered bonds become an important source of market financing for banks. A covered bond distinguishes itself from a senior unsecured bond by giving investors collateral in a cover pool. Norwegian banks are able to issue covered bond trough subsidiary covered bond companies. (Bakke and Rakkestad, 2010).

The collateral that lies in a covered bond company is privately and commercially owned real estate. When a bank provides a mortgage loan to a customer it takes collateral in the customers' real estate. The bank transfers this loan to a subsidiary owned covered bond company and gets cash in return. The covered bond company places the collateral in a cover pool and issues covered bonds which have collateral in the cover pool. Basically, a covered bond is priced the same way as a senior unsecured bond. The covered bond has a lower credit spread due to the collateral.

In chapter four we will go deeper into covered bonds and covered bond companies.

## *Market Financing - Deposits from financial institutions and short term deposits*

The shortest form of market financing is done in the money market. When managing short term liquidity both smaller and larger banks are able to attract short term deposits from other banks. Named banks[5] are also able to issue certificates[6] in the market to bring short term financing. These certificates can be issued in either Norwegian kroners or any other desired currency. The market for Norwegian kroners is often small, and if several banks are in need of short term liquidity at the same time they might not be able to obtain the level wanted. A bank could then raise Norwegian kroner by issuing a certificate, in for example, US dollars and then match it with a currency swap or a currency forward contract[7] to acquire Norwegian kroners. By doing this they aquire Norwegian kroners, by using the US dollar market to raise

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[5] By "named bank" we mean the largest bank in Norway, funding internationally.

[6] Certificates are a form of short term bonds. It has a maturity from 1 month up to 12 months, and are issued and traded as zero-coupon bonds.

[7] Currency swaps are a traded contract between two parts to exchange two currencies at the start of a period, and then change them back again in the future. The interest rate difference is paid either during the contract, or at the end of it. An Forward contract is contract where two parts agrees of a future purchase/sale of a currency. The interest rate difference is added at the spot price and makes the future price.

them. These markets are more liquid and Norwegian named banks are seen as a safe counterpart in the money markets (Hoff, 2011).

## *Deposits from customers*

Deposits from customers have historically been the most important source of funding for a bank. It is considered a safe and stable source of funding. Deposits count for 30% of a bank's total funding. Usually one can divide the deposits into deposits from households and corporations. However, the Norwegian Banks' Guarantee Fund divide between deposits who are covered by this guarantee and deposits who are not (Hoff, 2011).

The deposit guarantee guarantees for deposits up to 2 million Norwegian kroners for each person and each juridical corporate in each bank. Due to this guarantee deposits up to 2 million Norwegian kroner are considered the most stable source of funding. Approximately 55 % of all deposits in Norwegian banks are covered by the deposits guarantee and are considered a stable source of funding even in times with substansial financial turmoil (Lie, 2011).

Deposits over 2 million NOK's tend to be more volatile in times with financial turmoil. During the financial crisis in 2008 and 2009 some banks experienced volatility in these deposits. However, no Norwegian banks experienced dramatically reduced deposits during the financial turmoil. A reason for this may be that customers who had large deposits divided them in parts of 2 million each and placed them in several different banks. The total deposits actually increased during October 2008. International research shows that deposits not covered by deposit guarantees zx in small banks are be more volatile than larger banks. A reason for this is the belief that the government would do more to save a big and named bank than a small bank. Due to the systemic importance a big bank plays in a modern economy (Hoff, 2011).

Deposits from large corporate and institutional client often have different terms than deposits from retail clients. Retail clients have fixed terms that counts for all clients. A single retail client's behaviour has no interference with a banks liquidity management. Larger corporates and institutions have individually fixed terms on their deposits. This is due to the size of the deposits. If a large client wants to withdraw all it deposits in a single bank the bank might require a one month or one week notice due to the short term liquidity management.

Corporate and institutional clients often have an individually fixed price and individually fixed maturity on their deposits. While most deposits from retail clients are on a floating rate with

no maturity. However, new types of retail deposits, like "Housing Saving for Young People" (BSU) have extended their average maturity.

Deposits will usually be the cheapest source of funding for a bank. For depositors with deposits less than NOK 2 million deposits are considered a risk free investment and the required interest rate are therefore low. Historically the deposit rate has been below the money market rate. However, due to the financial turmoil and the difficulty to obtain senior bonds at an attractive margin, deposit rates have been well above the money market[8] rates for quite a while.

## 4.2.3 Different priorities in the capital structure in the case of an default or bankruptcy

In this section we will shortly state which capital that are subordinated to each other in a bank's capital structure given default or bankruptcy. Figure 8 shows the priority of the different sources of capital in the capital structure.
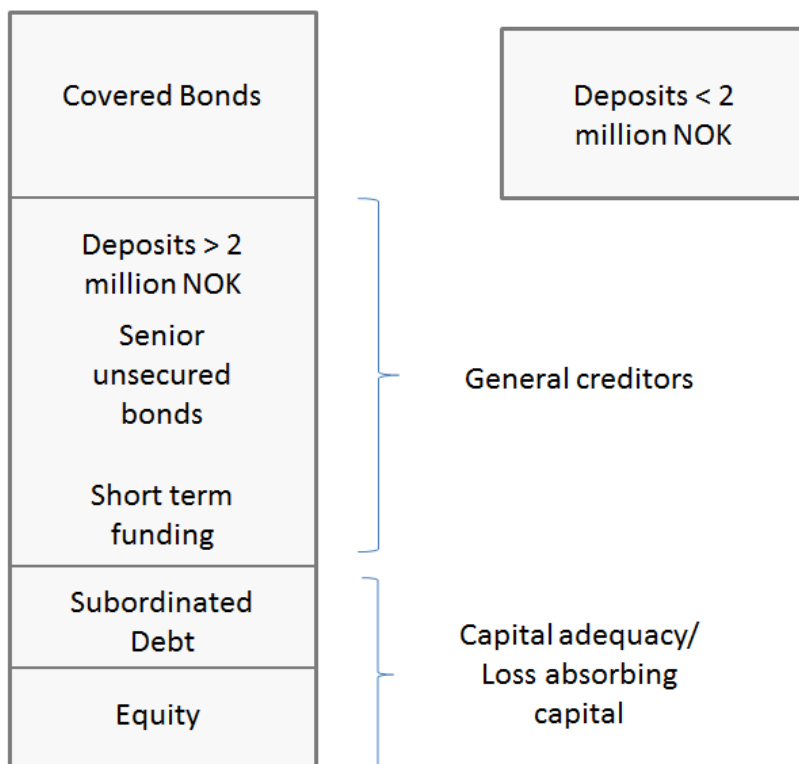


*Figure 8 Different layers of capital in case of a bankruptcy (Longsdon, 2012)*

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[8] Money market rates are interbank rates reported by the banks to the Central Bank of Norway each day. They reflect the interest a bank is willing to lend and deposit with in an another bank.

Covered bonds have the highest priority in a bank's capital structure. First of all are covered bonds secured by collateral and are, according to the Norwegian covered bond rules, over collateralized. A bank does also guarantee for the payments of covered bonds.

The subordinated debt to covered bonds are the holders of senior unsecured debt, depositors with deposit over NOK 2 million and other general creditors. All these creditors will be treated equally in case of a bankruptcy.

A Norwegian bank should according to the law be members of The Norwegian Banks' Guarantee Fund. A bank will therefore have insurance on all deposits from The Norwegian Banks' Guarantee Fund. If a bankruptcy occurs, all depositors will be refunded deposits up to NOK 2 million from the Guarantee Fund. The guarantee fund will thereafter search for refund in the bankruptcy estate and will have the same priority as the general creditors.

The next priority in the capital structure is subordinated debt. Subordinated tier two debt have seniority over tier one debt.As in all o ther firms, equity is the first layer of subordinated capital in case of a bankruptcy, being the first to take loss given bankruptcy.

All equity and subordinated debt make out a bank's capital adequacy. This is the capital that will take a loss prior to the banks general creditors.

## 4.3 Managing the balance and risk in banks

A bank's main responsibility is to achieve a high return on equity without taking excessive risk. Having a high interest rate margin, sufficient liquidity and a low risk on both the asset and funding side are crucial for a bank. In order to act responsibly banks are heavy regulated by both international and local regulatory authorities.

### 4.3.1 Risk in Banks

A bank faces several different risks both through its operations and the managing of its assets. Risk is typically defined as earnings volatility, or deviations from potential earnings. Increased volatility in earnings increases a potential for loss (Rajan, 2005). Further in this chapter follows an overview of the different risks a bank faces.

*Credit risk*

Credit risk reflects the potential loss due to the failure of a borrower to meet its obligations in accordance with the loan terms. In other words it is the risk of a bank's credit counterparty (borrower) fails to pay the interest rates or, even worse, fails to pay some of, or the entire principal. For a bank, credit risk will in most cases be located on the asset side, in the lending and long term bond holdings. As lending often is long term asset, credit will be calculated on a time horizon over one year or longer. (BIS, 1999). Research proves that credit risk counts for about half of the volatility in earnings and are therefore by far the largest risk a bank faces (Kuritzkes & Schuermann, 2008).

*Market Risk*

Market risk reflects the risk of potential loss due to movements in market prices or values. In particular this could the movements in interest rates, foreign exchange rates, equity prices and commodity prices. Market risk typically resides on the asset side in a bank and is associated with a banks trading or market making activities. However, as a bank trades different financial instruments they might have short positions which will be considered a liability (BIS, 2013). Research shows that market risk only provides about 5 % of a bank's volatility in earnings. However, this will vary from each bank. Norwegian banks does not typically involve with trading operations in a large matter (Kuritzkes & Schuermann, 2008).

*Structural Asset and Liability Risk – Liquidity Risk*

Liquidity risk or structural asset and liability risk is the risk related to the difference in the maturity between the assets and liabilities. A bank will usually have longer maturities on assets than on its liabilities. The asset might also be illiquid, and hard to sell at any given time, while funding could be withdrawn shortly and easily. Mortgage loans, for an example, tend to have a maturity of 20 years or even be everlasting, while deposits could be withdrawn overnight. A banks market funding have a longer maturity, but it is still has an original maturity of less than the assets. The average maturity on a senior unsecured bond issued by a Norwegian bank is 5 years, while it on a covered bond is 6 years (Syed, 2011). When a bank faces risk with respect to its structure of its assets and liabilities we could divide it into two parts.

The first risk is the risk for lack of liquidity. When a bank finance long term assets with shorter term loans they need to rely on refinancing either refinancing the short term loans, or sell the

assets with a low degree of loss. The assets of a bank are often illiquid and are hard to sell. The operation of a bank does therefore rely on a steady cash flow from generating funding from the financial markets. When financial turmoil occur, the investors may sell the risky assets and buy safer assets like treasury securities (Kuritzkes & Schuermann, 2008). Banks and other financial institutions stopped trading with each other.   Most banks need to trade with each other on frequent basis to manage its day to day obligations and access to both short and long term liquidity is crucial for the whole financial system. Large, named banks do this on a daily basis in the money market. During the financial crisis, after the fall of Lehman Brothers, the money markets froze. No bank was able to fund its short term obligations. There was no question about the price of liquidity; there was just lack of it, no one dared to lend it out. No matter how solid a bank was, it could not manage to rise short term funding (Hoff, 2011).

The other risk in connection with the liquidity and structure of assets and liabilities is the risk of price changes. Generally a bank has shorter duration on its financing than on its assets and is vulnerable in terms of price changes. If the price on short term funding rises and is not matched by a change in the price on long term lending, a bank would suffer a loss. A bank is dependent on a rising yield curve to profit from this strategy, as well as increased term premiums in the case of credit premiums. This risk comes to show when a bank refinances itself. In the aftermath of the financial crisis credit spreads reached record high levels. Banks would then refinance themselves with high credit premiums which, decreasing net interest margin, and likewise profit. However, a bank can limit its asset/liability structure risk by matching some of it funding and asset preferences. This risk is somewhat related to market risk. However, market risks are more related to a bank's traded assets, and its trading operations (Kuritzkes & Schuermann, 2008).

Kuritzkes & Schuermann (2008) shows that risks related to the structure of a bank's assets and liabilities account for about one fifth of the volatility in earnings. However, when it comes to the lack of liquidity seen during the financial crisis, we know that tail risks[9] can occur. Tail risks and their impacts are hard to predict and quantify.

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[9] Tail risks are risks that are not very likely to happen

These three risk factors are risks that occur due to the financial systems. These risks are a result of a bank being both a participant and an intermediary in financial markets connecting money holders and lenders. Banks also faces non-financial risks which are common to all firms.

## Operational risk

Operational risk relate to risk incurred by organizations internal activities. The people, systems and processes in an organization are vulnerable to uncommon events. The Bank of International Settlements (BIS) defines operational risk in the Basel II statement as risk of loss resulting from inadequate or failed processes, people and systems or from external events (BIS, 2001). The Basel committee specifically excludes reputational and strategic risk from its regulation framework. While the class of reputational and strategic risk can be identified, the consequences are hard to quantify. However, the reputation is important, and a bank usually uses significant resources on its reputation and strategy. In this paper, strategic risk is seen as a part of the business risk.

Legal risk does also play an important role in banking. This risk would be found both in the credit management and in a banks operation. Legal risk in credit management could, for an example include legal disagreements about collateral or loan covenants. In the operations, legal risk would include the risk of legal mishandling both internally and externally, against customers.

Operational risk distinguishes itself from other risks because operations, if done right, won't contribute to a bank's earnings. It will only contribute negatively if done wrong. It is all about limiting additional costs. Research shows that operational risk counts for about ten percent of the volatility in a bank's earnings (Kuritzkes & Schuermann, 2008).

## Business risk

As a bank is an intermediary between borrowers and lenders in the financial markets it needs strategies and business plans to make it attractive for the participants. A bank's business risk can also be called strategic risk. What overall strategy and business plan a bank chooses will affect the earnings and solidity of the bank. However, it is important to distinguish between the strategy in market, credit and liquidity management and the overall strategy a bank uses to attract borrowers and lenders (Kuritzkes and Schuermann, 2008).

*Systemic risk*

Systemic risk is the risk of an error which treats the entire banking system. Typically one would believe that this error would be incurred by the failure of either a bank or an important institution. If a large bank or institution would be unable to fulfil its obligations it could affect other banks, and then the entire banking system. In the aftermath of the financial crisis systemic risk in the banking sector became a widely used phrase among politicians, bankers and regulators. In the recent euro debt crisis one would also speculate in the degree of risk the default of a entire country would represent to the global banking system (Brander, 2011).

Systemic risk does not need to be banking specific; it could also be represented by errors in for example settlement systems, payments systems and clearing systems.

## 4.3.2  What we know about risks in banks

In the paper "What We Know, Don't Know and Can't Know about Bank Risk: A view from the Trenches" (2008) Andrew Kuritzkes and Til Schuermann discusses how different risks can be, or can't, be identified and managed.

They premise that risk represent a volatility in a banks potential earnings. They divide a bank's risk into three categories with respect to how easy they are to identify and to quantify. These three categories are known risks, unknown risks and unknowable risks. They further discus how manageable these risks are and whether an unknown or unknowable risks are able to be managed.

A risk is **known** if it can be identified prior to its origin. It will be able to calculate the probability for the risk occurring. It will also be able to calculate the impact of the risk, and maximum downside risks at a high confidence level. Known risks are easily quantified, and the impact of it occurring is easy to quantify. Also known risks make up the economic capital which is a common measurement of the amount of risk capital a financial firm must hold to cover the risk that is coherent with its operations and holdings. Economic capital is measured by determine how much capital a firm must hold to stay solvent given the historic volatility in its assets (FDIC, 2004).

A risk is **unknown** if it can be identified prior to its origin, but it is difficult to calculate the probability and the impact of it. It is possible to identify the risk; however, it is difficult to estimate its impact. Over time unknown risks will become more "known", as they can be

linked to random factors and be estimated indirectly. Examples of unknown risks are unquantifiable parts of operational and business risks, like reputational risk, and risks related to strategic mistakes.

A risk is **unknowable** if it is unable to predict and to quantify prior to its origin. When a risk is unable to predict it will also be unable to estimate the impact of it. Examples of such risks are the 9/11 attacks on the World Trade Centre.
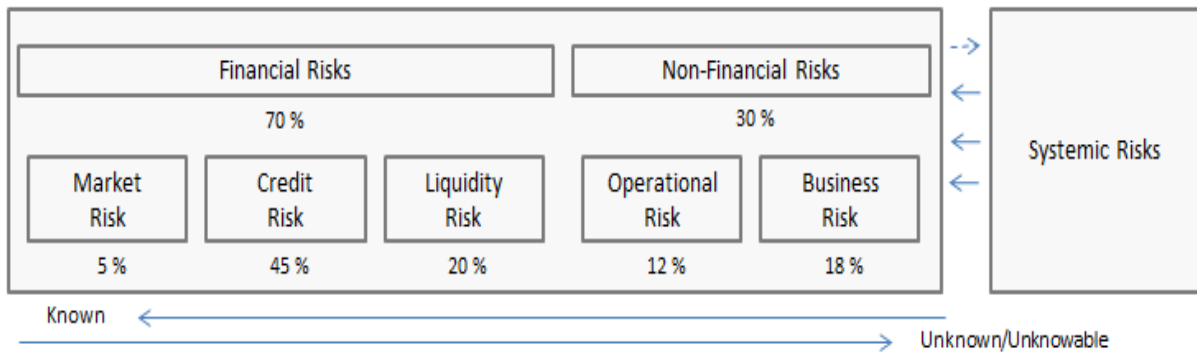


*Figure 9 Risk in banks (Kuritzkes and Schuermann, 2008)*

Figure 9 shows the risk in banks, and how much each risk factor contributes to the total risk. This data is based on Andrew Kuritzkes and Til Schuermann research from 2008. The research was made on over 300 large, medium and small sized American banks. If applying these numbers on other bank markets one should take into account eventual differences in operations. For an example Norwegian banks do engage less with proprietary trading[10] than large US banks.

In this research, systemic risk is not taken into account. Systemic risk plays an important role in the total risk of the bank market and will eventually affect individual banks. It is impossible to quantify both the probability and impact of systemic risks with high confidence. The risk will also be mutual. As systemic risks can affect individual banks, systemic risks can be triggered by an individual bank.

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[10] Proprietary trading is when a bank trades for its own account. The return of the trading directly affects the profit/loss of a bank.

The knowledge of risks in a bank increases with the ability to quantify it. When quantifying risk it is important to find an estimate of both the probability of it occurring, and the impact a risk will have. The knowledge of risk also increases as it is disaggregated and the knowledge increases down to more granular levels.

### 4.3.3 Summing up risks

Market risk is by far the most known risk. It is possible to disaggregate and quantify with a high confidence level. Less is known about credit risk. Even though that it is identifiable the low frequency of default rates makes it difficult to estimate the loss given default and the total impact with a high confidence. Liquidity risk is also identifiable; however, a low frequency of losses due to illiquidity provides an insufficient data set when calculating both the probability and the impact of it (Kuritzkes and Schuermann, 2008).

## 4.4 Capital Structure and Regulations

In order to secure financial stability strict regulation of banks are necessary. Banks play a substantial role in the financial system. As banks and other financial institutions constantly trade with each other turmoil among banks, or even a single bankruptcy, could be critical to the system. This could affect both the price and availability of credit for banks which in turn will affect the availability and price of credit towards the society (BIS, 2011).

During the financial crisis in 2007 – 2009 we saw how turmoil in the banking system effect economy and people's welfare. During the crisis not only low capitalized and distressed banks, but all banks found limited sources of funding which in turn led to a severe downturn in economic growth (Miles, Yang and Marcheggiano, 2011).

As a result, banks are regulated in a way to reduce excessive risk and to make them stay solvent in times of severe market turmoil. The Bank of International Settlements (BIS) which has formed the Basel Committee on Banking Supervision (Basel) has put together a global regulatory framework for more resilient banks and banking systems. These frameworks are referred to as Basel I, II or III[11], where Basel II is the current framework. However, these

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[11] Basel I, II or III symbols different releases of the Basel framework. Basel I was implemented in 1988. Basel II was implemented in 2003. Basel III was first drafted in 2010 and later rewised.

frameworks represents recommended regulations and are required by law. The European commission implemented the Capital Requirements Directive (CRD) which is based on the Basel Committees recommendations, affecting also Norway through the EEA agreement. Local regulators and governing departments are responsible for implementing these regulations.

Basel II is about to be replaced by Basel III. Basel III builds on the framework of Basel II and introduces enhanced and more complex rules for capital requirements, liquidity and transparency to the markets. The work on Basel III started in the aftermath of the financial crisis and will be phased inn trough CRD IV from 2015. Norwegian regulators imply that it will be phased in gradually and will be fully implemented by 2021. However, some of the requirements have already been phased in and banks are already adjusting for the new rules.

Banks are mainly regulated through capital requirements which are closely related to the amount of risk they are taking, and liquidity requirements. Regulations also require banks to provide a certain transparency of the quality of its assets through improved disclosure.

The Basel II and III framework is divided into three pillars. The first pillar deals with minimum capital and liquidity requirements towards credit risk, operational risk and market risk. The second pillar deals with the supervisory review process. The third pillar deals with improved market discipline by improved disclosure and transparency of the banks. In this chapter we will discuss these pillars more detailed. We will put a greater emphasis on the first pillar since this relates closer to our study.

### 4.4.1 Pillar I

#### *Capital requirements*

A bank is required to hold a certain level of capital depending on its assets and operations. Since different banks have different risk profiles on its assets and operations is it necessary for individually calculations. This is done by weighting the different assets and with regard to the risks involved. The result of this becomes risk-weighted assets which are used when calculating capital levels. Banks operations may also contain risk which will charge capital. This is called risk-weighted off-balance.

When calculating capital levels a bank will not include just equity in its definition of capital. They are also to some extent allowed to include layers of hybrid capital. As a result of this,

calculating a bank's capital ratios are far more cluttered than in a regular firm. A regular firm would simply divide its share of equity on the total value of its balance:

*Formula 4 Equity ratio*

$$Equity\ ratio = \frac{Equity}{Total\ assets}$$

In a risk-weighted balance the total assets will be exchanged with a risk-weighted calculation which is based on the credit risk, operational risk and market risk. For **credit risk, assets** will are calculated weights using an expected loss (EL) model taking into account the probability of default (PD), loss given default (LGD), exposure given default (EAD) and for commercial loans maturity (M). Banks could either use an internal rating based (IRB) where they calculate risk weights themselves, or an standard approach where risk weights are given based on the type of lender.

The total risk weights are derived using the volatility and frequency of the losses to all lenders. Regulatory capital are calculated on a basis that the regulatory minimum capital will cover all expected and unexpected losses in 99,9 % of all events.

For an example, a loan with a risk weight of 30 % requires a bank to hold 30 % of minimum required capital level against the loan. If the minimum required capital level is 8 per cent and the lending amount is one million the banks would hold: 1 mNOK* 30 % * 8 % = 24 000 NOK in common equity.

**Market risks** are the easiest quantified risks. As a base, banks use value at risk (VaR) models when calculating this risk. They could either choose to use a standardized approach, or a internal approach. When using internal models, these have to be approved by regulating authorities.

For **operational risks**, which are more difficult to quantify, less accurate models are used. The Basic Indicator approach is the simplest way to calculate operational risk. The capital charged is 15 % of the three year average gross income. Years with negative or zero income are excluded. The standardized approach targets smaller banks, and requires them to hold different percentages of capital against different operational business lines. These lines could for an example be business and settlements services. The Advanced measurement approach (AMA) allows bank to use own models to calculate their operational risk.

A risk-weighted balance will look different from a weighted one. Mortgages will typically have a lower value in a weighted balance since they historically have had low default rates, and will require less capital. Capital adequacy levels are all calculated on a group level including subsidiary companies the bank has ownerships in.

Different capital levels are divided into the capitals loss-absorbing capacity. Common equity is the first loss absorbing layer.

*Formula 5 Common equity*

$$Common\ equity = \frac{Equity}{Risk-weighted\ balance+risk-weighted\ off-balance} = \frac{Equity}{Risk-weighted\ balance}$$

The next layer of loss absorbing capital is lower tier one bonds. Lower tier one capital and equity divided by the risk-weighted assets constitutes the core capital adequacy:

*Formula 6 Core capital*

$$Core\ capital = \frac{Equity+lower\ tier\ one}{Risk-weighted\ balance}$$

The next layer of loss absorbing capital is the tier two capital.

*Formula 7 Subordinated capital*

$$Subordinated\ capital = \frac{Equity+lower\ tier\ one+tier\ two}{Risk-weighted\ balance}$$

Basel III has the following minimum requirements for a bank. As in Basel II a Bank is required to hold a minimum of 8 % of capital on its risk-weighted balance. This could be reached by using minimum 4,5 % common equity, 1,5 % hybrid capital and 2 % additional capital. However, the framework holds a new set of capital buffer requirements which are bank and cyclical specific.

These new capital requirements will not be counted as minimum requirements. However, if a bank breaches these requirements regulators have the ability to put restriction on how a bank should allocate their profit. In other words, both dividends and bonuses would be limited.

The first one is a **capital conservation buffer** of 2,5 % that should be fully reached by 2019. In periods with little or none financial turmoil banks should hold this buffer of capital above the regulatory minimum. If a bank breaches with this requirement it should try to retain inside capital or rise outside capital.

The second buffer is a **System buffer** which will be on 3 %. This buffer will be required for banks which are of a certain size and will make up a severe risk to the system if it comes under stress, or even worse, fails to meet its obligations.

The third buffer is for **Systemic important banks**. This buffer will only count for banks that are important for the banking system. Local regulators will decide which banks that will be covered by this requirement. The buffer may be as high as 2 %.

The fourth buffer is a **countercyclical buffer**. In economic downturns, distressed and destabilized banks may contribute to an even worse downturn. Excessive credit growth prior to an economic downturn may also increase the total system risk among the financial institutions. Local regulators can therefore put in place a countercyclical buffer when macroeconomic conditions points to this. The countercyclical buffer may be as high as 2,5 % and will be released when system risk dissipates.

All these new capital buffer requirements must be met with common equity. When all the buffers are implemented the requirement of common equity will be 14,5 %, for core capital will it be 16,5 % and for subordinated capital 18 %. This is shown in figure 10.
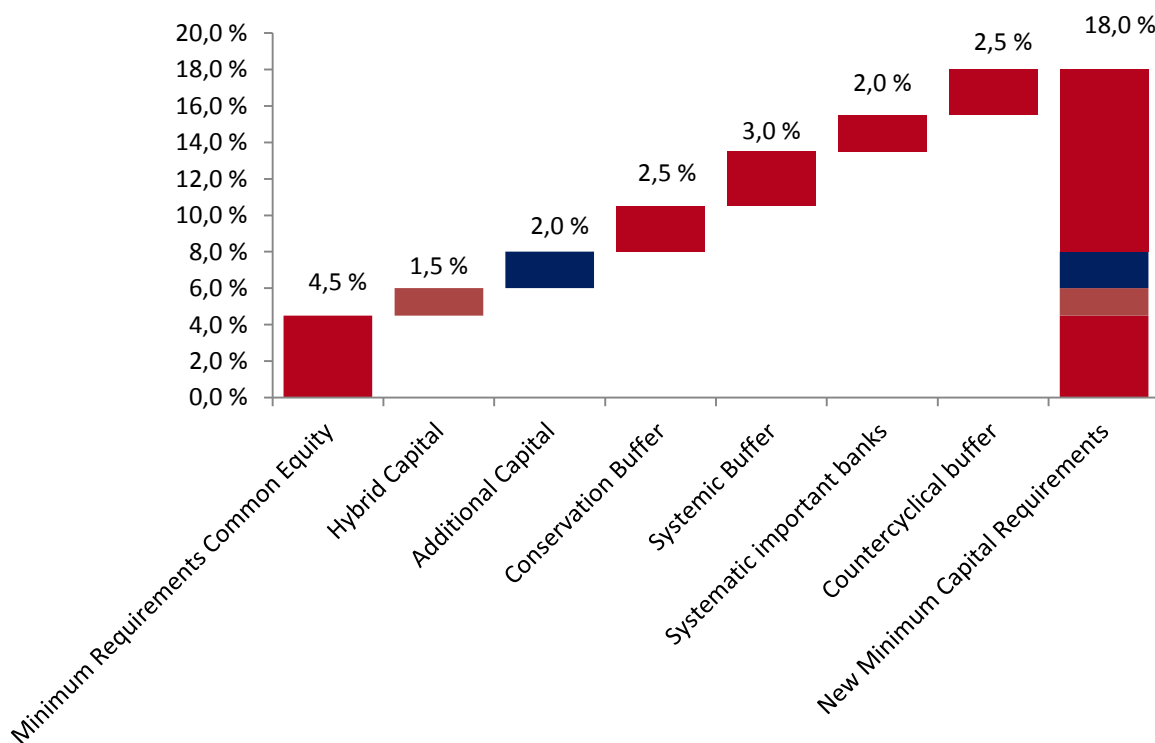


*Figure 10 Capital requirements under fully implemented Basel III. Red is common equity, grey is hybrid capital and blue is subordinated capital (Christensen, 2013)*

## Liquidity requirements

In Basel III there are introduced two new liquidity requirements. The objective of these indicators is to strengthen the banks and the banking sector in case of severe financial distress and turmoil. This will reduce the spill-over effects from the banking sector to other parts of the economy.  There are developed two indicators that will be the minimum standards for liquidity. This is the Liquid coverage ratio (LCR) and the net stable funding ratio (NFSR).

LCR is developed to ensure that banks have a short term sustainable liquidity capacity. This is done through a requirement that a bank has an adequate stock of liquid assets of high quality assets that ensures that the bank will tolerate severe financial distress over 30 days. These assets need to not be pledged as collateral. The LCR requirement is based on this equation:

*Formula 8 Liquid Coverage Ratio*

$$LCR = \frac{Stock\ of\ liquid\ assets\ of\ high\ quality}{Net outflow\ next\ 30\ days} \geq 100\ \%$$

The liquid stock of assets will be weighted after how high quality they have. Cash, government bonds and covered bonds and corporate bonds with an AAA[12] rating will give a 100 % weight. Senior unsecured corporate and bank bonds will give a lower weight and stocks will have the lowest weight.

The various posts included in the net outflow are weighted by the expected outflow in case of severe financial distress ("bank run").  Time contracted deposits will have the lowest weight. Deposits that are covered by the government deposit guarantee do have a low weight. Deposits from financial actors have the highest weight. There is a high probability that these deposits will vanish in case of financial distress.

The NSFR is developed to ensure a long-term sustainability of a bank's funding program through requirements that a bank has a balanced maturity structure of its assets and liabilities. The time horizon is one year. NFSR sets the minimum amount of stable funding a bank must hold based on the asset composition and maturity. Simplified NSFR is a weighted fraction of a banks' balance sheet where liabilities are divided by assets.

---

[12] AAA rating given from one of the large rating agencies, which contain Moody's, S&P and Fitch.

*Formula 9 Net Stable Funding Ratio*

$$NSFR = \frac{Avaliable\ quantity\ stable\ financing}{Necessary\ quantity\ of\ stable\ financing} \geq 100\ \%$$

## 4.4.2 Pillar II

### *Supervisory review process*

As the first pillar focuses on a banks holdings and operations the second pillar focuses on the supervisory process of a bank's complete risk. When a bank increases both its size and risk it should not only focus on maintaining the required amount of capital, but also further develop their internal risk management and risk monitoring techniques.

Pillar II also deals with risks that are hard to quantify and not captured in the pillar one framework. This could be credit concentration risk – the risk of not diversifying. It could also be risks that are hard to quantify, like strategic risks, business risks and systemic risks. The second pillar will try to evaluate the bank's capital adequacy compared to its complete risk profile.

Banks are required to implement an Internal Capital Adequacy process, also known as ICAAP. This process undertakes the making of, and implementing of a risk-management framework for the bank. The ICAAP framework ensures that a bank holds enough capital to meet its requirements and that it manages the risk not captured under the first pillar. The ICAAP report will be submitted to local regulators for review and approval.

If the report show weaknesses in a bank's risk-management or high risks which are not covered in the first pillar it has the ability to require that the bank holds a higher level of regulatory capital than the minimum levels (Moody's, 2012).

## 4.4.3 Pillar III

### *Disclosure and Market Discipline*

The third pillar focuses on a banks transparency and the market discipline arising from this. As a complement to the first two pillars it focuses on letting the market participants getting an insight in the bank's risk-exposures, risk-processes and capital adequacy levels. These market participants could be investors, analysts, asset managers, other banks, clients etc.

The information given through the third pillar is more detailed than the annual and quarterly financial statements. If banks choose to use internal rating processes (IRB and AMA) the third pillar will provide a granular information about these. This way it will allow the market participants to compare banks with each other.

Letting the markets get this information it encourages them to discipline the banks. For an example: If a bank has a high and uncontrolled risk exposure the market would discipline them by requiring them to hold a higher level of capital. If the bank doesn't do this the market will require a higher risk premium and thereby require higher bond yields, rates on deposits etc. (Moody's, 2012).

These new rules are already affecting how banks operate (FSA, 2010). In order to meet the new standards of Basel III of holding on to more capital, the banks are

- Paying out less dividend
- Increasing their lending rates
- Lowering their interest rates on bank deposits

As the Norwegian InterBank Offered Rate (NIBOR) has been historical low, Norwegian banks has been criticized by the Minister of Finance, Sigbjørn Johnsen, for not lowering the lending rates. The banking industry has defended their actions by claiming that the increased capital is a part of the implementation of Basel III (Bjørnestad, 2013).

## 4.5 The Credit Rating Agencies

In order to issue covered bonds, the issuer is in need of two separate ratings by two different rating agencies. The most common used credit rating agencies are the "Big Three": Moody's, Standard & Poor's (S&P) and Fitch. The rating of the bonds tells us two things: 1) the credit risk is and 2) how much expected loss given default is. The agencies have different approaches rating the bonds, hence bonds have different rating depending on which agency rating the bond. Even though, they all highlight three important matters of special importance in their reviews of the bonds (Bakke and Rakkestad, 2010):

- Issuers credit rating
- The quality of the assets in the cover pool and the cover pools ability to maintain a steady cash-flow

- The cover pool's independence from the issuers other assets

Fitch is following a three step process rating the bonds. The first step is to give issuer a credit rating and to find the "discontinuity factor" meaning the risk of bondholders not getting their payments in time if the issuer goes bankrupt. The next step is an assessment of the cover pools ability to pay the bondholders given different scenarios. In the final step it is assumed that the bond is raised and the cover pool are sold to see of the claim of the bondholders will be met.

Before S&P set the credit rating they analyze the issuer in two different ways: First they look at the payment solutions for the bondholders and how well the national legislation protects the bondholders. This sets the floor for further rating. How many steps above the floor the rating will be depends on how S&P see the risk of the cover pool. For a covered bond in the highest category there will be a limit to the number of steps if it is not associated with any form of uncertainty to the cover pool, while for covered bonds in category two and three there will be an upper limit the number of steps.

Moody's credit rating process consists of two different assessments. First they find the probability of the issuer becoming insolvent and the strength of the cover pool. The second thing they consider is if the payments to the bondholders will come to the right time even if the issuer becomes insolvent. This is known as the "timely payment indicator". The higher the "timely payment indicator", the higher the credit rating will be.

# 5. Part 3: Covered bonds in Norway

The covered bonds legislation, as we know it, came into effect in June 2007. In 2001, the Norwegian government conducted a survey (Bakke and Rakkestad, 2010) which recommended securitization of banks assets by issuing bonds. The survey led to a model introduced in 2004. In this model several considerations were taken into account:

- Improved competitiveness for the Norwegian finance industry by offering a long term and less expensive financing
- Reducing the liquidity risk
- Increased diversification for investors
- Creating a market for fixed-rate loans
- Cheaper loans to the public as a result of cheaper financing for banks

The new model was introduced in 2007 and was highly anticipated. The new legislation had several differences comparing to the old one. The most important was that the credit institutions could now encumber the loans without an agreement with the borrower (FSA, 2012).

When covered bonds was introduced in Norway it had already been existing for two hundred years in Germany and Denmark. In the late 17th Century Germany started issuing *Pfandbriefe* in need of an organized credit market. By the middle of the 18th Century, German mortgage banks started issuing Pfandbriefe in order to refinance new mortgage loans.

## 5.1 The Norwegian Housing Market – A closer look at the underlying asset of Covered bonds

The main reason why the Norwegian covered bonds has been received so well by the market is the underlying asset of covered bonds, the mortgages. The Norwegian housing market is, as the Norwegian economy, look upon as very stable and in good shape. Even though there has been speculations' regarding that the prices may have reached its absolute maximum. The Statistics Norway (SSB) has concluded that the prices will grow between 5-10% until the year 2015. Their forecast is saying that the prices will stabilize from 2015 and from then follow the BNP-growth of 2-4%. (SSB, 2012)

The Norwegian mortgage market is approximately worth NOK 1900 bn. Norway has among the highest percentage of home ownerships in the world, very few buy to rent out (20% of the mortgages). The borrowers are personal liable for their debt, also for outstanding debt post foreclosure and forced sales. This means that given a personal default of the borrower, then the borrower can't escape the mortgage by leaving the house, which is the practice in the US.

During the Norwegian bank-crises in the late 80's/early 90's the Norwegian housing market showed it's resilience. Even though the banks experienced large problems due to expansive lending during the 80's, they had close to no losses in residential mortgages. The Norwegian housing market showed the same resilience during the financial crisis in 2008 when the house prices fell 18 % (adjusted for inflation) during two quarters of ultimo 08 and primo 09 before the prices again started to rise (Eitrheim and Erlandsen, 2011)

A stress test of Norwegian banks conducted by the Norwegian Central Bank (Norges Bank, NB) showed that the housing prices could fall up to 35% before the credit institutions are in danger of breaking the balance requirement (the value of the pool must exceed the value of the bonds). Since most of the mortgages has a LTV below 75%, there won't be a proportional change between fall in housing prices and fall of the pool value. Further on, the NB found that a 10% fall in housing prices will reduce the pool by 3% and a big fall of 40% will reduce the pool by 23%. The sample of this test was 75% of the covered bonds issued by Norwegian banks (Norges Bank, 2012).

## 5.2 "Bytteordningen"

During the fall of 2008, Norwegian banks experienced large problems financing themselves. Since the Norwegian interbank market is not adequate enough, Norwegian banks are required to enter the American dollar-market by swapping USD for NOK and vice versa. When Lehman Brothers declared themselves bankrupt September 2008, the confidence between banks disappeared. This eventually made it difficult for Norwegian banks to find suitable counterparts for the swaps. The Norwegian Central Bank (NB) – in order to give liquidity to the banks - offered the banks to swap covered bonds for Norwegian government bonds. By selling the government bonds by auction, the banks had to specify how much they wanted, the length of the deal and how many basis points above a certain fixed price they were willing to pay.  When the deal is finished, the banks are required to buy back the covered bonds at the same price they were sold for.

The Norwegian government bonds are looked upon as a very safe and are easy tradable. This swap made sure that the banks regained confidence and they could again return to the dollar-swap market.

This exchange between The Norwegian Central bank and the banks was essential to secure financing for the banks. In total, over NOK 230 bn in covered bonds was transferred to the Norwegian Central Bank. By spring 2014 all the covered bonds should be returned to the banks. The financial crises started a "flight to quality", making triple A rated bonds very popular (Klovland, 2012).

Since the exchange proved to be very effective, more and more banks started up their own credit institutions. Before the exchange there was 7 credit institutions and now – in 2013 - after several consolidation the last years, there are a total of 23 credit institutions in Norway (European Covered Bond Council, 2012).

## 5.3 Norwegian legislation

Norwegian covered bonds are regulated by two laws: «Lov om finansieringsvirksomhet og finansinstitusjoner» from 1988 and «Forskrift om kredittforetak som utsteder obligasjoner med fortrinnsrett i en sikkerhetsmasse bestående av offentlige lån, utlån med pant i bolig eller annen fast eiendom» from 2007. These laws say that the bonds must be issued by a credit institution and the loans making the pool must be owned by the same credit institution. The loans may be transferred from the bank or given directly by the credit institution. In case of default, the covered bonds owner has a direct claim towards the credit institution and the underlying asset, the pool. The pool is a mix of mortgages and mortgages relating commercial property, loans to government within the EEA or OECD or derivatives were the counterparty has a sufficient low risk class. The mortgages must be within 75% of the total market value of the property and the commercial property must be within 60% of market value. Each loan can account for maximum 5% of the pool and maximum 15% of the pool can be directly exposed to banks. 20% of the pool can be collateral consisting of deposits or very safes bonds as government bonds.

The value of the pool must always exceed the value of the issued bonds. The pool is valued to market value while the covered bonds are valued using the present value-method. Assets that not are within the requirements of the legislation may still be a part of the pool, but should not

be included calculating the balance requirement. This means that the bonds owners may – given default – have claim towards assets not meeting the requirements of the Loan-To-Value. To make sure the pools are meeting the standards, The Financial Supervisory Authority of Norway have order an independent committee to inspect the cover pool every three months. The institutions are also committed to initiate stress test ensuring that they meet the financial requirements of the covered bonds owners.

If a credit institution experience difficulties securing the bonds owners their payments, the government may take control of the credit institution. The government will then act as the bankruptcy administrator together with the bond owners (Bakke and Rakkestad, 2010)

## 5.4 Concentrated vs. Dispersed ownership

Of the 23 mortgages credit institutions in Norway, 5 of them have a dispersed ownership. Dispersed ownership means that several banks has a joint venture, contributing assets and sharing risk, in opposite to concentrated ownership where there – in this case – there is one owner taking all the risk and contributing with all the assets.

### 5.4.1 Theory of Concentrated ownership

Ownership is regarded as an important control mechanism of the firm. Principal-Agent theory argues that if ownership and control is separated, the firm may lose value (Jensen and Meckling, 1976). Jensen and Meckling concluded that large investors are better to protect their investments than several small investors, provided the large investors invests time and resources on disciplinary measures. Principal-Agent theory further argues that a concentrated group of principals (owners) reduces agent cost making concentrated ownership and payoff correlated.

Concentrated ownership reduces the diversification opportunities of the owner, hence carrying an unnecessary large risk (Demsetz and Lehn, 1985). This would imply that concentrated ownership isn't common, when it's actually the opposite making it hard to believe that the loss of diversification exceed the gains of having control rights in the firm (Shleifer and Vishny, 1986).

## 5.4.2 The verdict of the market

In March of 2009, Moody's downgraded Terra Boligkreditt AS from Aaa to Aa2. Moody's explanation was simple: Due to dispersed ownership and the absence of an explicit and irrevocable joint and guarantee from the owner banks, Moody's downgraded Terra Boligkreditt covered bonds. From Moody's rating report (Moody's, 2009):

*"As is the case with other covered bonds, Moody's considers the credit strength of the transaction to be linked to that of certain parties, in particular the Sponsor Bank. Should such credit strength continue to deteriorate, all other things being equal, the rating of the Covered Bonds might be negatively affected"*

Terra Boligkreditt is owned by 78 savings bank and one housing cooperative, OBOS (SEB, 2011). It's likely to believe that the investors trust the rating agencies to make sure how the ownerships-structure affect the safety of the covered bonds. Norges Bank, the central bank of Norway, is illuminating the aspects of the dispersed ownership stating that there is a legal risk with covered bonds. Since there has been no legal events regarding the covered bonds and how this will affect the banks, there is much uncertainty to be resolved. The credit agencies focus is whether the cover pool is separated enough from the others assets of the owner, so in case of default, the investors are not forced to join negotiations (Bakke and Rakkestad, 2010).

Even so, the Norwegian legislation is very much alike the German legislation where covered bonds has a long history.

# 6. Part 4: Descriptive part

In the past few years encumbrance of assets have been more frequently used among European banks. Among Norwegian banks the encumbrance has mainly been used throughout repo agreements with the Norwegian Central Bank and throughout the transfer of loans to covered bond companies. Mortgage loans with high quality have been transferred in to subsidiary owned covered bond companies. As a result of the transfer of mortgage loans the composition of both the asset side and funding side in the parent bank. In the banking group as a whole we see that the composition of funding has changed. This has changed the risk involved for general creditors to the parent bank.

The Norwegian covered bond model makes the degree of encumbrance in the parent bank more complex. However, due to the guarantees given from the parent bank to the covered bond company, the result of transferring mortgage loans to a subsidiary covered bond company gives an equal result as if the loans where encumbered and still where on the balance.

In this chapter we will give an economic approach to the changes that take place when a bank transfers it mortgage loans over to a subsidiary owned covered bond company. We will study how the transfer of mortgage loans takes place, how it will appear on a bank's balance, and how it hypothetically will affect the situation for the general creditors in the parent bank which also covers the owners of senior unsecured bonds.

## 6.1 The transfer of mortgage loans to covered bond companies

In the Norwegian covered bond model the mortgage loans are transferred from the parent bank to a subsidiary owned covered bond company. The collateral which lays behind these mortgage loans are used in a cover pool which is used as collateral for the covered bonds issued by the covered bond company. This distinguishes the Norwegian banks covered bonds from the most of the other banks covered bonds where both the covered bonds and the assets remain on the balance of the parent bank.

Furthermore, in this section, we will go through the transfer of mortgage loans from the parent bank to a subsidiary owned covered bond company. We have chosen to divide the secretion into five steps. The first four steps describe how the mortgage loans have been transferred to

a covered bond company and been used as collateral to issue covered bonds. The fifth step describes how the parent bank might choose to use the cash it acquires from transferring the covered bonds to a covered bond company. The Bank faces several choices on how they could use the cash. Figure 11 shows the five steps figuratively (Bakke and Rakkestad, 2010)
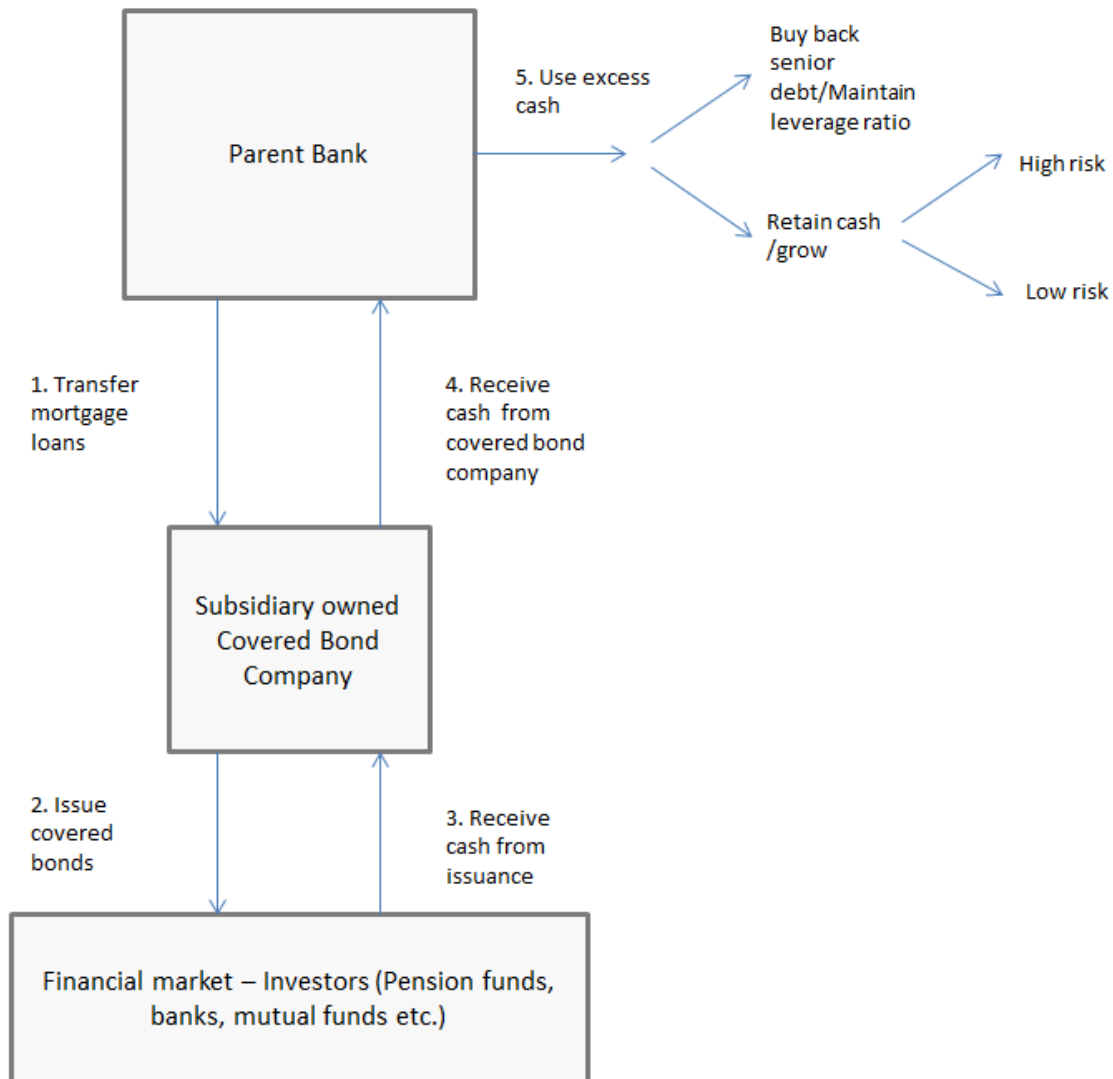


*Figure 11 The Norwegian Covered Bond Model (Bakke and Rakkestad, 2010)*

*The first step is when the parent bank transfers qualified mortgage loans to its covered bond company. The covered bond company will then "owe" the parent bank for the loans it has received. The mortgage loans it receives has collateral in real estate. This collateral will be put in a covered pool.*

1. The covered bond company then issues covered bonds which are covered with collateral in the cover pool.

2. These bonds are sold openly on the financial market. The investors are pension funds, government funds, money market funds or other investors.

3. The covered bond company then uses this money to pay back the parent bank for the loans that it received.

4. After this transformation the parent bank has "sold" a share of high quality mortgage loans to its covered bond company and received cash. However, in the banking group as a whole, the loans are still on the balance. Simply said; they have been encumbered and used as collateral for issuing new debt, and the total amount of debt has gone up. How the parent bank chooses to use the cash acquired from the issue of covered bond is important for the development in both size and risk in the parent bank, and on the stakeholders in the parent bank.

The parent bank then faces several choices on how they could dispose their cash acquired from the selling of the covered bonds. Further in this section we will discuss the different choices it faces.

If the banking group wants to maintain its leverage ratio it will start to buy back other liabilities. Since the bank can't buy out depositors, and short term debt is important for the liquidity management it will usually start to buy senior unsecured bonds. To maintain its leverage ratio it will buy the exact same amount of senior unsecured debt as it acquired from issuing covered bonds. In that way, the bank group as a whole has maintained its size and leverage ratio. Since regulatory capital is calculated on a group level this would be necessary for banks with limited sources of regulatory capital.

However, if a bank has the necessary quantities of regulatory capital it has the possibility to use the excess cash to grow. It could use the cash to expand in activities associated with higher degree of risk like commercial lending or trading activities. Commercial lending and trading activities is compiled with a significant higher risk than lending to households. The overall risk of the bank will therefore rise given all else equal.

If a bank chooses to use its excess cash to expand its liquidity portfolio by buying government or covered bonds with a high rating the overall risk of the bank would decline given all else equal. Covered bonds and government bonds with a high rating are compiled with a lower risk than lending to households. A bank may use the excess cash to buy covered bonds issued by peer banks. This would diversify the bank's assets and therefore reduce risk the overall risk

given that the risk of the covered bonds holds a somewhat equal risk to the banks own covered bonds.

## 6.2 Balance composition after the transfer of mortgage loans – Maintained leverage ratio

The transfer of mortgage loans to covered bond companies will change the balance of the parent bank and the banking group as a whole. Further in this section we will explain these changes.

Table 2 illustrates the balance of a typical larger, Norwegian, rated bank prior to the introduction of covered bond companies. It holds both the lending to corporation and households on its balance. The majority of the banks market funding is obtained by issuing senior unsecured bonds.

| Assets | | Liabilities and Equity | |
|---|---|---|---|
| Cash/Liquidity portfolio | 8 | Deposits | 30 |
| Loans to households | 50 | Market financing (senior bonds) | 50 |
| Loans to Corporations | 30 | Other debt | 10 |
| Other investments/assets | 12 | Subordinated debt and equity | 10 |
| | | | |
| Total Assets | 100 | Total Liabilities and Equity | 100 |

*Table 2 Simplified balance sheet of a fictitious Norwegian bank prior to the introduction of covered bonds.*

The bank has these typical characteristics:

- A medium sized liquidity portfolio, 8 %
- A higher share of lending to households than to corporations, 5/3 ratio
- A medium deposit-to-asset ratio, 30 %
- High share of senior unsecured debt financing, 50 %
- A share of 10 % subordinated debt and equity. This would be the loss absorbing capital

For convenience, the numbers in the banking balance is given in billions. We can assume that 80 % of the bank's mortgage loans (40 bn.) have sufficient amounts of collateral and does therefore qualify for the transfer to a covered bond company.

In this example, the bank chooses to transfer all of these loans out of the parent bank, and in to the subsidiary owned covered bond company.

The bank has an un-weighted capital adequacy[13] of 14.93%[14]. Let's assume that the bank is required to hold 10 % loss absorbing equity in the covered bond company to acquire the rating desired. Figure 15 shows the balance of the covered bond company. The covered bond company receives 40 bn. worth of mortgage loans which it uses as collateral to issue covered bonds. Due to the desired capital level of 10 % it issues covered bonds for 36 bn. Table 3 shows the balance of the covered bond company.

| Assets | | Liabilities and Equity | |
|---|---|---|---|
| Loans to households | 40 | Market financing (Covered bonds) | 36 |
| | | | |
| | | Equity | 4 |
| Total Assets | 40 | Liability and Equity | 40 |

*Table 3 Simplified balance of a covered bond company.*

Immediately after the parent bank receives cash for the secretion of mortgage bonds it has a large amount of cash/liquid assets available. Table 4 illustrates this.

| Assets | | Liabilities and Equity | |
|---|---|---|---|
| Cash/Liquidity portfolio | 44 | Deposits | 30 |
| Loans to households | 10 | Market financing (senior bonds) | 50 |
| Loans to Corporations | 30 | Other debt | 10 |
| Other investments/assets | 12 | (Off balance) guarantee for cov bonds | |
| Ownership Cov. bond company | 4 | Equity | 10 |
| | | | |
| Total Assets | 100 | Total Liabilities and Equity | 100 |

*Table 4 Balance of parent bank immediately after the transfer of covered bonds*

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[13] Often known as the leverage ratio. Note this definition of the banking leverage ratio (i.e. capital/unadjusted assets) operates contrary
to normal concepts of leverage, in the sense that a higher 'leverage ratio' means lower 'leverage' in an economic sense of debt-to-equity.

[14] For the loans to households: 50 bn * 50% = 25 bn. For the loans to corporations: 30 bn * 100% = 30 bn. Other investments / assets: 12 bn * 100% = 12 bn. In total: 67 bn. Equity = 10 bn. Capital adequacy ratio $= \frac{10}{67} = $ 14.93%.

Originally, the risk in the parent bank has gone down. It has sold high quality mortgage loans with low risk, and received cash, which has no risk. The capital adequacy is at the same level as before. However, capital adequacy is calculated on a group level, and the loans are still owned by the group. Table 5 illustrates the balance of the banking group.

| Assets | | Liabilities and Equity | |
|---|---|---|---|
| Cash/Liquidity portfolio | 44 | Deposits | 30 |
| Loans to households | 50 | Market financing (senior bonds) | 36 |
| Loans to Corporations | 30 | Market financing (covered bonds) | 50 |
| Other investments/assets | 12 | Other debt | 10 |
| | | Equity | 10 |
| | | | |
| Total Assets | 136 | Total Liabilities and Equity | 136 |

*Table 5 Banking groups balance immediately after the transfer of covered bonds*

The total size and leverage ratio of the bank group has increased. The bank holds relatively less loss absorbing capital than before.

If we further assume that the bank wish to maintain its leverage ratio and to hold the capital adequacy levels at 10 %. To do this, the parent bank will buy back senior unsecured debt. It will buy back 36 bn. of senior unsecured debt. Table 6 illustrates the balance of the parent bank with a maintained leverage ratio.

| Assets | | Liabilities and Equity | |
|---|---|---|---|
| Cash/Liquidity portfolio | 8 | Deposits | 30 |
| Loans to households | 10 | Market financing (senior bonds) | 14 |
| Loans to Corporations | 30 | Other debt | 10 |
| Other investments/assets | 12 | *(Off balance) guarantee for cov bonds* | |
| Ownership Cov. bond company | 4 | Subordinated debt and equity | 10 |
| | | | |
| Total Assets | 64 | Total Liabilities and Equity | 64 |

*Table 6 Balance of parent bank with maintained leverage ratio.*

In this balance we have introduced an off-balance post on the liability and equity side called "guarantee for covered bonds". The parent bank has several legal ties to the covered bond company. For an example, it has to guarantee for the for the covered bonds company's

issuance of covered bonds. The Parent bank will also have to guarantee for the covered bond company to all times hold a certain amount of equity. A general creditor must take this into account when analysing the risk in the parent bank.

The balance of the parent bank has increased due to its ownership in the covered bond company. The capital adequacy does therefore reach levels of 19,6%[15]. However, in the banking group, the balance of both the parent bank and the covered bond company is consolidated. Table 7 illustrates the balance of the banking group.

| Assets | | Liabilities and Equity | |
|---|---|---|---|
| Cash/Liquidity portfolio | 8 | Deposits | 30 |
| Loans to households | 50 | Market financing (senior bonds) | 36 |
| Loans to Corporations | 30 | Market financing (covered bonds) | 14 |
| Other investments/assets | 12 | Other debt | 10 |
| | | Equity | 10 |
| | | | |
| Total Assets | 100 | Total Liabilities and Equity | 100 |

*Table 7 Banking Group balance after the introduction of covered bonds.*

The balance of the banking group does to some extent look familiar with the balance introduced in the beginning of this chapter. The composition of the assets is the same as before. The main change has occurred among the market funding of the bank. Covered bonds do now count for 36 % for the total funding. The covered bonds have encumbered 40 bn. of lending to households as collateral. These loans are the assets with the highest grade of quality.

The remaining creditors general must adhere to the parent bank. From table 6 we observe that the parent bank has several new characteristics:

- A relatively greater liquidity portfolio, 12,5 %
- A greater deposit-to-asset ratio, 46,8 %

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[15] For the loans to households: 10 bn * 50% = 5 bn. For the loans to corporations: 30 bn * 100% = 30 bn. Other investments / assets: 12 bn * 100% = 12 bn. The ownership in the covered bond company: 4 bn * 100% = 4 bn. In total: 51 bn. Equity = 10 bn. Capital adequacy ratio = $\frac{10}{51} = 19.61\%$.

- A decreased ratio of senior unsecured bonds as a funding source: 21,9 %
- A major shift towards corporate lending. 75 % of all lending are now lending to corporates.
- Other investments counts for a larger part of the balance, 18,8 %, this could be activities like proprietary trading or venture investments.
- The share of subordinated debt and equity has risen to 15,6 % of the balance. However, when adjusting for the guarantee it has for the equity in the covered bond company. It remains at 10 %.
- The parent bank has other guarantees for the covered bond company. This is considered an off-balance risk. In an risk-weighted balance this would be an "liability" for the parent bank.

In the next section in this chapter we will further discuss how the risk has changed for the general creditors in the bank, and thereby the owners of senior unsecured bonds.

## 6.3 Risk and collateral in the parent bank – What's left for the senior bond holder?

As we shown in the previous section, after the secretion of mortgage loans to a covered bond company, the balance of the parent bank has made a major shift away from household lending. The activities in the parent bank now consist in a greater degree of lending to corporations and other businesses.

As we earlier have stated, holders of senior unsecured debt are exposed for credit events[16] that would occur in the in the parent bank. The composition of the balance sheet and the activities in the parent bank are therefore important for the risk profile for the holders of senior unsecured debt.

After the separation of mortgage loans the degree of senior unsecured bonds as a funding source has decreased. However, as we presented earlier, all the banks general creditors are equally prioritized in the case of a bankruptcy. The depositors, financial institutions, holders

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[16] A credit event occurs when the lender, in one way or another, breaches with its loan agreements. This could either be missing payments, like missed interest payments or missed principal payments, or breaches with other agreements that may be stated in the covenants.

of long term senior unsecured debt and short term debt owners will all be treated equally in the case of a bankruptcy. The only source of funding which has a lower priority is the equity and subordinated debt.

We discussed and presented Kuritzkes and Schuermann (2008) research on banking risk. They approached risk as the deviation from potential earnings, and divided them in to what extent they are quantifiable (knowable). Figure 1 illustrates their findings and the percentages of them.
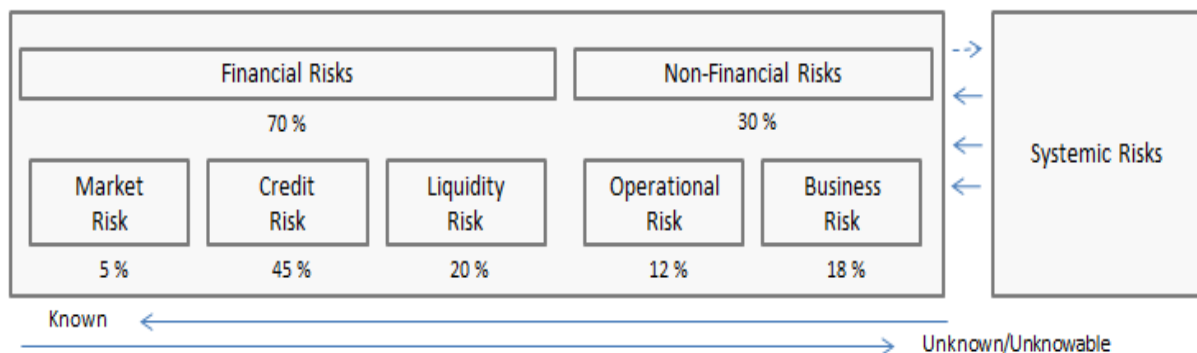


*Figure 12 Risks in banks given in percentages and rated after the degree of possibility to quantify them (Kuritzkes and Schuermann, 2008)*

Further in this chapter we will analyse how the risk has changed in the parent bank emphasising these sources of risk.

### 6.3.1 Financial Risk

After the secretion of mortgage loans the balance sheet has clearly made a major shift towards corporate lending and other investments. Lending to corporation is assembled with more risk than lending to households. When a bank lends to a household it takes collateral in the real estate. Historically low volatility of real estate prices and the requirements of over-collateralization make lending to households coherent with low risk (Norges Bank, 2012). We could also assume that the lending to households which are left in the parent bank is of a lower quality than those who are transferred (Sparebanken Vest, 2013)[17]. Given all else equal this

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[17] In Sparebanken Vest's Pillar three document from 2012 they states than lending to households which are not transferred to a covered bond company has a higher degree of expected loss, than the loans which are not.

would increase the **credit risk** for the parent bank. Credit risk is also by far the greatest source to risk in a bank (Kuritzkes and Schuermann, 2008).

Banks' other investments may contain activities which relates to **market risk**. In our example, after the secretion of mortgage loans, there is no theoretically evidence that the bank has increased its market risk. However, as mortgage loans are taken of the balance, activities which contain market risk represent a relatively greater proportion of the parent banks activities. The market risk has therefore increased for the parent bank.

Regarding **liquidity** risk there are several factors to take into account. The parent bank has acquired a relatively greater liquidity portfolio by obtaining more cash. By introducing covered bonds it has also established additional sources to funding. This indicates a lower liquidity risk However, the guarantees it gives to its covered bond company might limit some of the benefits of establishing it.

### 6.3.2  Non-Financial Risk

**Business risk** and **operational risk** are hard to quantify and it is difficult to say if they have decreased and increased. However, we could with confident say that both the operational risk and business risk is greater in the parent bank than in the covered bond company.

### 6.3.3  Increased leverage ratio

In this chapter we have not emphasised on how risk would develop if the bank would increase its leverage ratio. If a bank would increase its leverage ratio the further development in risk would depend heavily on how they would choose to grow.

In the next chapter we will analyse how the risk in the parent bank has changed. We will analyse the rate of encumbrance and the quality of the remaining assets. We will further look on how it has changed the price of senior unsecured debt. We will discuss our findings with respect to financial theory, regulations and other related phenomena in the financial markets.

# 7.  Part 5: Analysis

In this chapter we conduct an analysis of the changes in the banks' balance sheets. We will look closer on the transfer of mortgage loans, the encumbrance and on the assets and risk that are remaining in the parent bank. We will further study how this has affected the price of senior unsecured debt.

We will conduct this analysis on a representative sample of Norwegian commercial and savings banks. Covered bonds were not introduced in Norway prior to mid-2007. This limits the time frame of this analysis. However, we will introduce other variables that are not directly related to encumbrance and the introduction of covered bond companies in our analysis. In the year 2007 banks introduced new accounting principles. They were required to use the new principles on numbers back to 2005. The analysis is based upon the time from the fiscal year 2006 to and including the fiscal year 2012.

The first step in this research is to study the rate of encumbrance in our sample of banks. We analyse each respective banks annual statement to acquire the information about how much each bank is transferring to its covered bond company. The next step is to analyse the quality of the remaining assets in the parent bank. To find this we will use the respective banks pillar 3 documents in addition to the annual reports. Since the banks have different ways to report its risk in the pillar 3 documents, we will only find a rough measure of the quality of the assets. Still, we are confident that this will provide a solid base for our further research.

The next step is to analyse how the encumbrance and the quality of the remaining assets have affected the price of senior unsecured bonds. We will analyse the time series of senior unsecured prices and use a fixed-effect panel-data regression analysis to compare them with the degree of encumbrance and quality of remaining assets. We have found five factors we mean could represent changes in the banks respective balance sheets.

The financial crisis began softly in mid-2007 when several European banks and hedge funds reported losses on financial products related to the American housing market and mortgage loans. It reached it most harsh levels in September 2008 when Leman Brothers filed for bankruptcy. The money market dried up, and both the equity and credit markets experienced severe turmoil. When the money market regained some of its confidence in mid-2009 the debt problems among European countries came to the surface, the euro crisis. The euro crisis has

in a varying extent been a source of financial turmoil since 2009. In our research we will adjust for financial turmoil and changes in overall market premium by using a dummy variable.

## 7.1 Our research sample – Banks included in the research

The Norwegian Bank Market has historically been dominated by saving banks. However, the trend is pointing in the direction of fewer and larger banks. In 1922 there were about 600 savings banks in Norway. Today there is about 110 savings banks and 20 commercial banks. About 77 of the savings banks are small sized and operating under the Eika Alliance[18] and 19 banks are operating under the SpareBank 1 – Alliance (Syvertsen, 2012).

However, the size among the banks is much skewed distributed. The largest bank is by far DNB ASA, which counts about NOK 2264,84 billion in total assets (including insurance). There is a large step down to the second largest bank is a Swedish owned commercial Bank, Nordea Norge ASA, with NOK 550 billion in assets. The second largest Norwegian bank is SpareBank 1 SR-Bank with NOK 140 billion in assets.

We have chosen to look at a representative sample of Large and medium sized Norwegian Commercial and saving banks. Due to the skewed distribution of the unequal size of Norwegian banks and different legal frameworks in the Nordic countries we had to line up some criteria for the sample of the banks:

1. Since Norwegian covered bonds were introduced in 2007, a delay on the rest of the Nordic countries we would only analyze fully owned Norwegian Banks. This omitted Swedish- and Danish banks Norwegian branches from our list.
2. The Bank must be a significant participant in the senior unsecured debt market. It needed to have a certain amount of senior unsecured debt issued at all times. This omitted small banks from our list.
3. The Bank needed to fully or partly own a subsidiary Covered Bond Company. However, the degree of ownership in the covered bond company will not matter in our research, when we will analyse the remaining assets in the parent bank only.

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[18] Eika is an alliance for small saving banks, earlier on known as the Terra group.

This left us with six Norwegian Banks:

**DNB ASA:** Total Assets[19]: NOK 2013,4 billion, independent commercial bank. Rating parent Bank[20]: A+ Covered Bond Company: DNB Boligkreditt ASA. (AAA)

**Sparebanken Vest:** Total Assets NOK 127,83 billion, independent savings bank. Rating parent Bank: A. Covered Bond Company: Sparebanken Vest Boligkreditt: (AAA).

**SpareBank 1 SR-Bank:** Total Assets NOK 141,54 billion, Commercial Bank in Alliance. Rating parent Bank: A. Covered Bond Company: SpareBank 1 Boligkreditt (AAA)

**SpareBank 1 SMN:** Total Assets NOK 107,92 billion. Savings bank in Alliance. Rating parent Bank: A. Covered Bond Company: SpareBank 1 Boligkreditt (AAA)

**SpareBank 1 SNN:** Total Assets NOK 75,26 billion. Savings bank in Alliance. Rating parent Bank: A. Covered Bond Company: SpareBank 1 Boligkreditt (AAA)

**SpareBank 1 Hedmark:** Total Assets NOK 44,11 billion. Savings bank in Alliance. Rating parent Bank: A. Covered Bond Company: SpareBank 1 Boligkreditt (AAA)

DNB and Sparebanken Vest are independent banks and holds their own respective covered bond company. The Four "SpareBank 1" banks are in an alliance and are all part holders of SpareBank 1 Boligkreditt.

The SpareBank 1 Banks have, unlike the two other banks, part-ownerships in their covered bond companies. They therefore do not include loans transferred into the covered bond company in their consolidated annual statements. However, in our analysis we will include the value of these loans so we would get comparable inforamtion for the banks.

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[19] All Total assets at year end 2012. And are given by the Banking Group.

[20] Ratings that given from either Standard and Poor's or Moody's. Standard and Poor's rating scale are used. If there's only given ratings from Moody's the S&P equivalent is used.

## 7.2 Data presentation

We have studied our respective banks annual reports and gathered information about development in their use of covered bonds as a funding source. We have also studied the quality of their remaining assets. In our data set, DNB is by far the largest bank. DNB will therefore be of great impact in our statics. In cases where the data from DNB or any other banks differs from the rest of our sample we will inform about these findings and discuss them. Before determining the variables in our data set we will shortly discuss some of the findings.

## 7.3 Increasing use of covered bonds

Our data shows an increased use of covered bonds since their introduction in mid-2007. DNB already established their covered bond company in 2005. The SpareBank 1 banks established their covered bond company in 2007, and Sparebanken Vest established their covered bond company in 2008. Figure 13 illustrates our sample banks increase of mortgage lending transferred to subsidiary covered bond companies since 2006. In 2006 there were NOK 23,25 billion worth of mortgage loans transferred to covered bond companies. In 2012 the number reached NOK 670 billion.
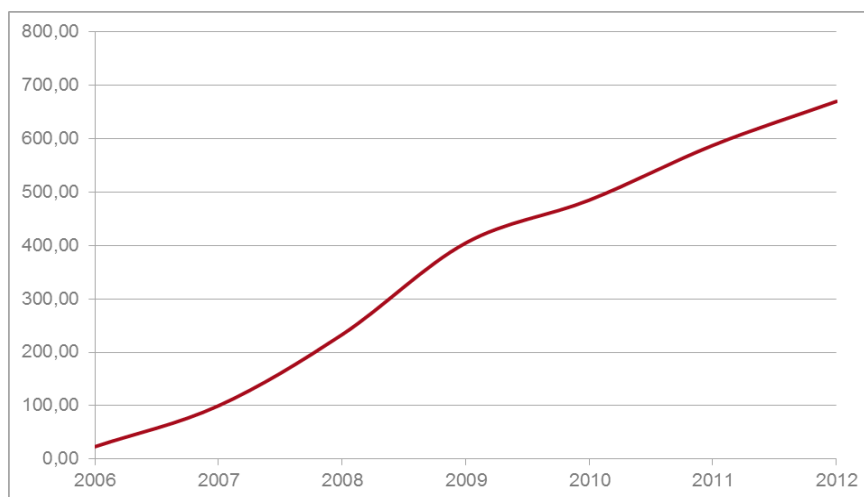


*Figure 13 Total amount of mortgage loans transferred to covered bond companies in our sample banks.*

The use of covered bond companies has become an increasingly important since 2006. Table 8 shows mortgage loans transferred to covered bond companies as a percentage of a banking

group's total assets ($\frac{Mortgage\ loans\ transferred\ to\ a\ covered\ bond\ company}{Total\ assets\ Banking\ group}$ ). As we see from the table, over 25 % of all banks assets are now transferred into covered bond companies and are therefore encumbered.

| Bank | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| DNB | 2,1 % | 7,2 % | 12,1 % | 20,9 % | 24,3 % | 24,6 % | 25,8 % |
| SPV | 0,0 % | 0,0 % | 8,6 % | 12,2 % | 20,6 % | 26,8 % | 30,6 % |
| Sb1 SR-Bank | 0,4 % | 4,6 % | 8,9 % | 16,7 % | 16,2 % | 25,6 % | 25,6 % |
| Sb1 SMN | 0,0 % | 3,7 % | 8,0 % | 15,8 % | 15,6 % | 18,2 % | 21,5 % |
| Sb1 SNN | 0,0 % | 3,6 % | 7,4 % | 14,7 % | 17,5 % | 19,0 % | 22,5 % |
| Sb1 Hedmark | 0,0 % | 0,0 % | 4,4 % | 10,0 % | 16,0 % | 18,7 % | 22,5 % |

*Table 8 Degree of encumbered mortgage loans as percentage of total assets.*

Figure 14 illustrates the same relationship for our sample banks.
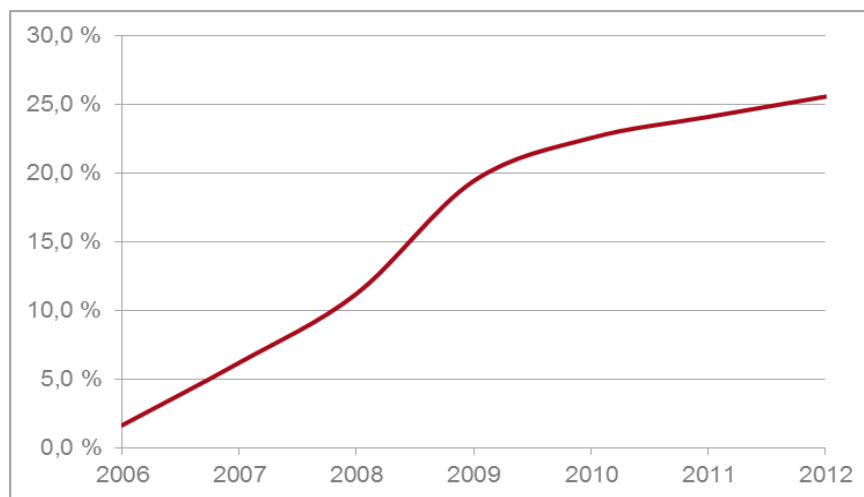


*Figure 14 Mortgage loans transferred to covered bond companies as percentage of total assets. Yearly rates.*

Figure 15 shows the degree of household lending which are transferred to covered bond companies ($\frac{Mortgage\ loans\ transferred\ to\ a\ covered\ bond\ company}{Total\ lending\ to\ households}$). As we can see, almost 70 % of all lending to households are transferred to subsidiary owned covered bond companies. Given that not all lending to households consists of mortgage loans, it also consists of

consumer loans, car loans, etc. the degree of all households transferred to covered bond companies is higher.
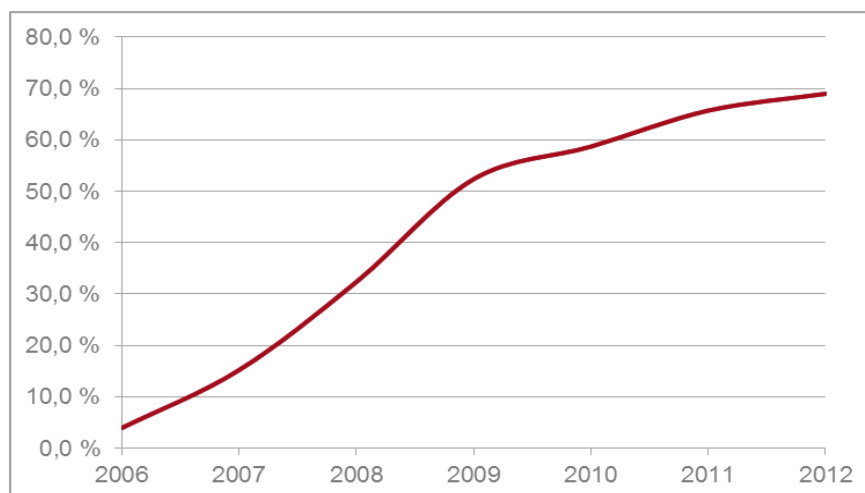


*Figure 15 Percentage of all lending to households transferred to covered bond companies.*

Between the respective banks in our sample, the degree of mortgage loans transferred to covered bond companies varies. DNB has the highest degree with over 80 % of all lending to households transferred to its covered bond company, while the other banks in our sample have a more conservative degree of 40 % to 50 % transferred. There could be several reasons for this. DNB was the first company to introduce covered bonds already in 2005. They are by far the largest bank in Norway and are therefore also the leading bank in many processes. However, all of our sample banks have transferred between 50 % and 80 % of their lending to household to covered bond companies.

From figure 14 and 15, we could also observe a phenomenon discussed earlier. The use of covered bonds increased sharply during the financial crisis in 2008 and 2009. Due to the increased risk aversion in the financial markets acquiring long term senior unsecured debt became expensive for the banks, at some points there where even a limited availability for long term unsecured debt. The banks therefore increased the transfer of mortgages so they could issue more covered bonds. The covered bond market became an increasingly important source of funding during the financial crisis (Norges Bank, 2011).

## 7.4 Quality of the remaining balance sheets in the parent bank

Since the holders of senior unsecured debt are exposed for changes in the parent bank, one important part of our study is to see how the balance in the parent bank has shifted. We will especially emphasise on the shift of lending in the parent bank. When mortgage loans are transferred into a covered bond company, all else equal, the lending in the parent bank would make a shift towards corporate lending. Corporate lending is composed with a higher degree of risk than lending to households.

The Pillar three reports shows that the banks in our sample reports significant higher probability for default rates and expected loss rates on corporate lending than on lending to household. When dividing lending to households into lending related to real estate lending not related to real estate (car, consumer loans etc.) we observe significant higher loss rates on lending not related to real estate.

The pillar three banks in our sample show these characteristics:

- **Corporate lending** has an average probability of default (PD) rate on 2,9 % among our sample banks. The average expected loss (EL) rate is at 1,1 %. Among the banks we see that DNB has the lowest PD and EL rates, while the SpareBank 1 Banks have higher rates.
- **Household lending not related to real estate** have an average probability of default rate on 2,4 %. The average expected loss rate is 0,7 % . Among the banks do SpareBanken Vest have the lowest PD and EL rates while the SpareBank 1 Banks have the highest rates.
- **Household lending with collateral in real estate** have by far the lowest probability for default with an 0,62 % average. The expected loss is also lowest with an average of 0,085 %.

As we could read from the pillar three documents, the lending which stays in the parent bank's balance has a greater expected loss rate than the lending which are transferred to covered bond companies.

In our research we will focus on the degree of corporate lending relative to household lending remaining on the parent banks' balance after the secretion of mortgage loans. Figure 16

illustrates the relationship of corporate lending relatively to household lending remaining on the parents bank balance ($\frac{Corporate\ lending}{household\ lending\ in\ parent\ bank}$). A rate of 1 will illustrate an equal part of corporate lending and lending to households.
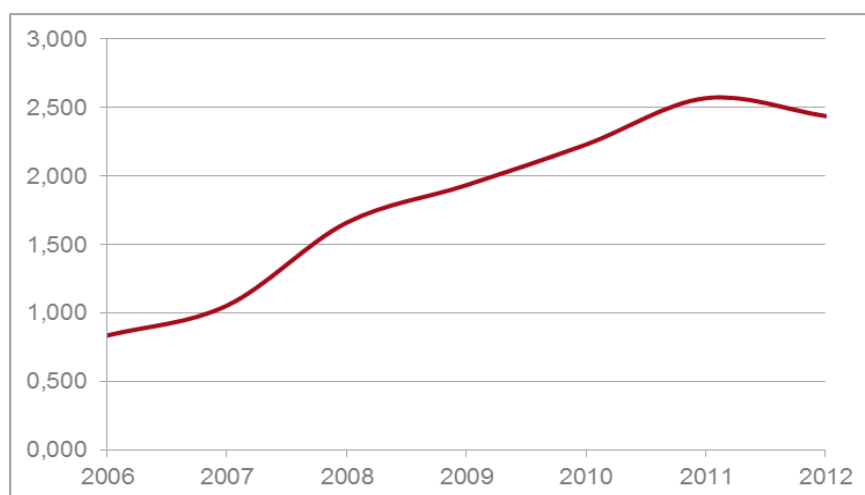


*Figure 16 Lending to Corporations relative to lending to household lending.*
*X-axis: Years. Y-axis: Corporate lending / Household lending-ratio.*

However, there are great differences between the banks in our sample. DNB has historically had a high degree of lending to corporates while the smaller banks have had a lower ratio of lending to corporations. There are several reasons for this. As a large bank DNB has the possibility to take on greater commitments to large corporates which has a lower risk than smaller corporations. Their size also gives them the possibility to diversify, and use more resources on lending to corporates. Table 9 shows the difference between the member banks.

| Bank | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|------|
| DNB | 1,01 | 1,37 | 2,41 | 3,31 | 3,97 | 5,05 | 4,47 |
| SPV | 0,27 | 0,30 | 0,45 | 0,46 | 0,54 | 0,66 | 0,70 |
| Sb1 SR-Bank | 0,60 | 0,73 | 0,95 | 1,08 | 1,09 | 1,13 | 1,08 |
| Sb1 SMN | 0,56 | 0,59 | 0,82 | 1,11 | 1,22 | 1,15 | 1,23 |
| Sb1 SNN | 0,50 | 0,56 | 0,58 | 0,60 | 0,62 | 0,65 | 0,74 |
| Sb1 Hedmark | 0,45 | 0,43 | 0,51 | 0,55 | 0,62 | 0,63 | 0,67 |

*Table 9 Corporate lending relative to household lending in the parent bank.*

As we could see from both figure 16 and table 8, the lending in the parent bank has made a major shift towards corporate lending. This supports our intuition of that, all else equal, a transfer of mortgage loans would shift the balance towards corporate lending. DNB has a

significant larger share of corporate lending than other banks. However, we see the same trend among all the banks in our sample. They have gone from a corporate lending ratio of among 30 % to a ratio greater than 50 %.

As the bank has transferred mortgage loans it has also grown its liquidity portfolio it holds in the parent bank. This is shown in figure 17. The total rate has increased from 11 % in 2006 to about 15 % in 2012. However, there are large differences between the banks. While DNB has had a relatively large liquidity portfolio from 2006, the other banks in our sample has had an increase in their portfolios from about 5 % in 2006, to about 15 % in 2012.
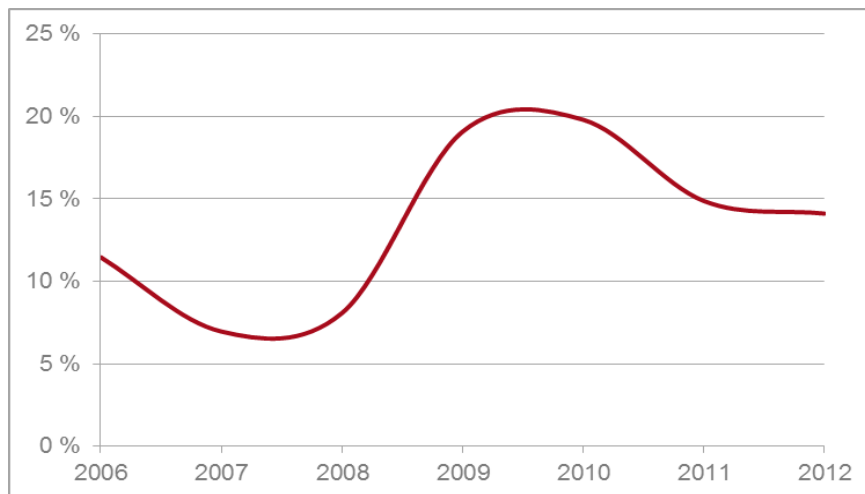


*Figure 17 Liquidity portfolio as percentage of the total asset in the parent bank.*

The liquidity portfolio plays an important role managing a bank. However, the annual reports report the size and composition of the liquidity portfolio at a point-in-time. The liquidity portfolios are liquid and the size and composition of the portfolios could therefore be very volatile. We have therefore chosen to not emphasize on the liquidity portfolios in our study.

## 7.5  Prices of senior unsecured bonds

Senior unsecured bonds on Norwegian Banks are traded daily in the financial markets. However, there has historically been a low transparency in the Norwegian bond market. Not all trades have been reported to the stock exchange and the trades have occurred over the

counter[21]. Getting sufficient data on each banks bond prices have therefore been difficult. We have acquired second hand indicated bonds spreads on fixed maturities from a panel of bonds from different brokerages in Norway. The bond prices observed from the brokerages should represent the largest banks in Norway who are also represented in our panel.

Figure 18 illustrates time series of senior unsecured bonds spreads in basis points for DNB and large Norwegian "coastal banks", which includes the banks in our sample. They indicate the spreads over 3 month NIBOR rate or swap rate with different fixed maturities.
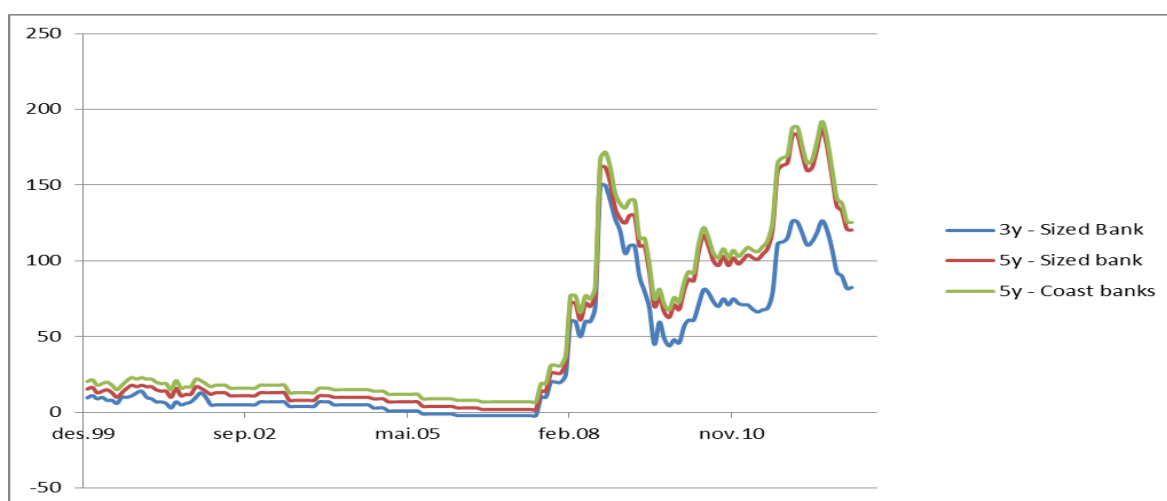


*Figure 18 Spread on senior unsecured bonds (Nordea, 2013).*

As we could see, bond spreads where very little volatile until the start of the financial crisis. In our research we will need to adjust for this. The spread between DNB and the costal banks have historically been between 4-8 basis points. During the most severe turmoil in the financial crisis this spread increased to about 10 basis points. However, in mid-2009 the spread between DNB and the coastal banks went back to 5 basis points and have been on these levels since.

In our analysis we have chosen the five year fixed maturity to represent the bond spreads. For DNB we will use the 5 year sized bank spread. Due to the low transparency for spreads for the

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[21] Over the counter, or OTC trading is when two parts trade with each other without going through any stock exchange. All bond trading in Norway go over the counter. However, the different brokerages have lately been required to report their trades to Oslo Stock Exchange so they can provide transparency to the markets.

different costal banks we have chosen to use the 5 year costal bank spread as a reference spread for all the six remaining banks.

We have chosen to use the five year fixed maturity. Most trades done in the secondary market are done on maturities around 5 years. This gives the market a good transparency and gives the brokerages a good data sample to base their indicative prices on.

## 7.6 Measured variables in our research

In our study we observed five variables over time which we have decided to test against the margin spreads of senior unsecured bonds in our sample banks. We will use the time series from each of these variables on our sample banks to generate a panel data set.

### 7.6.1 Size, $x_1$

Size is important for banks. Being a named and sized bank gives many direct and indirect consequences. The most important direct consequences of are economics of scale and greater access to funding. A named bank will have an easier access in the financial markets due to its name and its broad investment base. Investors would also be more comfortable investing in a sized bank due to the liquidity of its issued instruments. Instruments of sized banks are traded daily in the markets in opposition to smaller banks whose instruments could be traded weekly, or even more infrequent.

One indirect consequence for a bank is the implicit state guarantees a sized bank has. If the general creditors of a sized bank are required to take a loss on its investments/deposits it may cause great financial turmoil. The threshold for letting a large bank go bankrupt is higher than for a small bank. We will discuss this further in the analysis of our findings.

### 7.6.2 Degree of encumbrance of mortgage loans as a percentage of the total balance $x_2$

The encumbrance of mortgage loans is the main focus in our research. We will test if the percentage of mortgage loans transferred to a covered bond company has an impact on the spreads of the banks. Since the mortgage loans which are transferred also are encumbered and that Norwegian banks aren't allowed to use encumbrance in the parent bank this will give us

a measure of the encumbrance in the banks. A higher degree of encumbrance will give a higher risk, all else equal.

### 7.6.3 Corporate lending relative to household lending in the parent bank, $x_3$

When mortgage loans are encumbered holders of senior unsecured debt will be exposed for the assets which are left in the parent bank. Corporate lending relative to household lending gives aa measure of the balance composition. Since the expected loss are higher in corporate lending will a higher lending to corporates give a higher risk, all else equal.

### 7.6.4 Capital adequacy, $x_4$

Capital adequacy is measured by adding equity and subordinated debt. This is the capital that is subordinated to the general creditors of the bank. A higher capital adequacy will therefore give a lower risk for the banks general creditors given all else equal.

### 7.6.5 Profitability given by return on equity (ROE), $x_5$

A banks return on equity is one of the most important key-numbers for banks. Investors, analysts and management itself watches this number close. A higher return on equity tells us that the bank has a higher ability to pay interest and principal on their loans. A higher return on equity will therefor give a lower risk all else equal.

### 7.6.6 Dummy variable: The financial crisis

In our research we have used a dummy variable in the year of the financial crisis. The worst impact from the financial crisis came in 2008. However, in the credit- and money markets the turmoil started earlier. Already in 2007 one started to see that the risk premiums in the money markets started to rise. The TED-spread which is given by the difference between the 3 month USD-Libor rate (London interbank offered rate in US-dollar) and the 3 months treasury bills issued by the US-government. The USD-Libor rate is the interest rate named banks use to lend unsecured to each other's in the London money market with 3 months maturity. This rate reflects, off course, the future short term rates the next three months, but also the credit and liquidity risk among the bank market since the banks lend unsecured with each other. The treasury bills have a low rate of credit risk since the risk for the US government to default on their three months payments are extremely low (MacroBond,

2013). Figure 19 shows the TED-spread from 2005 until May 2013. From the figure we could see that the risk premiums in the money market already increased in august 2007. This was when the French Bank BNP Paribas reported that two of its hedge funds had large difficulties taking money out of their funds due to illiquidity in the markets.



Kilde: Makrobond/Sparebanken Vest
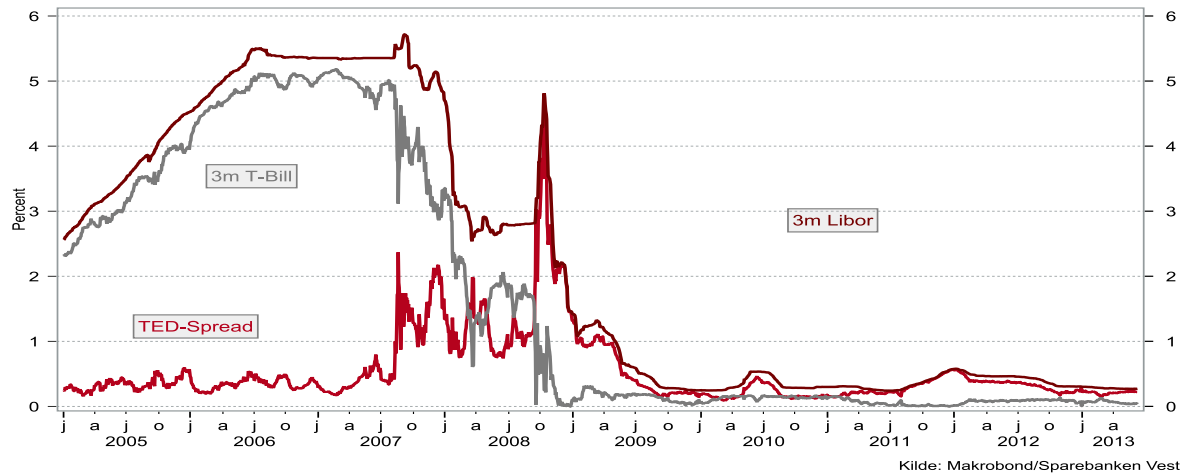
*Figure 19 Ted Spread 2005 - 2013 (MacroBond, 2013)*

The most common way to measure money markets turmoil in Norway is the spread between the 3 month NIBOR (Norwegian interbank offered rate) and the policy rate set by the Norwegian bank. Since the 3 month NIBOR rate is a function of the expected short term rates the next period the NIBOR would also price in expected changes in the policy rate. However, it is also a function of the credit and liquidity risk and we could well observe an increased spread in times of financial turmoil. Figure 20 illustrates the spread between the 3 m NIBOR and the policy rate. Norwegian money markets are affected by the international ones, and we witnessed an increased spread from mid-2007. However, the spread held high levels until mid-

2012.
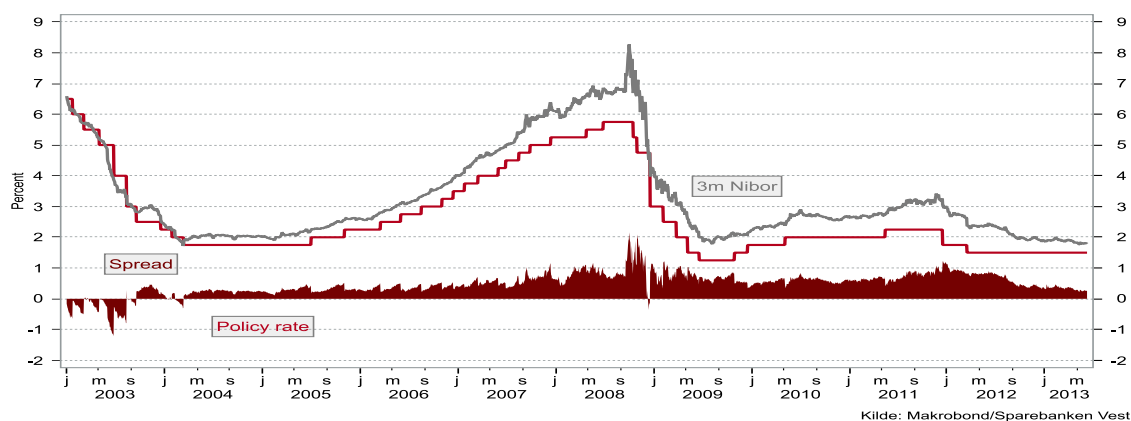


*Figure 20 Spread between 3M NIBOR and policy rate (MacroBond, 2013)*

## 7.7 Method – Fixed effect method

To test if our variables have a significant effect on the credit spreads we have made a set of panel data. Our panel data is represented by five independent predictive variables measured on six individual banks. We have measured these variables repeatedly over a time period. In order to adjust for the financial- and euro- crisis we have used a dummy variable. However, we will test our five variables with and without the use of the financial crisis dummy. We will test these variables against the indicated second hand credit spreads for senior unsecured banks in our sample. The credit spreads denotes our dependent variable. These spreads are shown in figure 19.

By using this panel data we could capture both the variation over the sample of banks and variation over time. The six banks in our sample have had unequal developments during our research period.  By using panel data we can control for variables that we cannot observe or measure. This could for an example be differences between banks. It could as well be a variable that has changed for the whole group of entities. Examples of this are policy changes and regulations. When using panel data we were allowed to include variables at different levels. This has given us the possibility to use variables that are on different level in a bank's operations, for an example using both size and profitability as variables (Woolridge, 2009).

The data in a panel set would have the following form.

<center>*Formula 10*</center>

$$x_{it}, i = 1, \dots, N \; t = 1, \dots, T$$

The variables are noted x, where *i* is the type of variable and *t* is the time dimension. The panel of data would create a matrix of the independent variables. Our set of panel data is fully balanced; this means that we have sufficient data for all variables in all years in our data set.

To test if the variables in our panel data sample have an effect on the spreads of the senior unsecured bonds we have chosen to use the fixed-effect model. The fixed-effect model can be denoted as:

<center>*Formula 11*</center>

$$Y_{it} = \alpha_i + \beta_i x_{it} + u_{it}$$
<center>And:</center>

<center>*Formula 12*</center>

$$u_{it} = \mu_i + \varepsilon_{it} \text{ which equals the error term}$$

$Y_{it}$ = Is the dependent variable, *i* is the entity and *t* is the time

$\alpha_i$ = Is the intercept for each entity *i*

$x_{it}$ = Is the independent variables

$\beta_i$ = Denotes the coefficient for the independent variables

$\mu_i$ = Denotes time-invariant individual specific effects of each variable.

$\varepsilon_{it}$ = Denotes time-variant errors for each variable over time.

We will use the fixed effect model because we have a set of variables that vary over time, and we are interested in analysing the causes these variables might have on changes in the dependent variable. It also controls for all time-invariant characteristics of the banks.

The fixed effect model is designed to study how the predicative variables cause changes for the dependent variable. Using the fixed effect model we will explore the relationship between the credit spreads and the different predicative variables from our banks.

All the predictor variables in our research changes over time, none are constant. This allows us to use the fixed effect model. If we were to analyse time-invariant characteristics we might have wanted to use a different a different type of regression, like the random effect regression.

However, using the fixed effect model we assume that some individual characteristics among our banks might or might not have an impact on the outcome of our credit spreads. These individual characteristics could for an example be that the banks are systematic important, reaches a broader investment base, or are in a greater size than all others.

One example of this is DNB. It has a greater size than all other banks. It is also an internationally named bank and has historically had a broad access to the financial market. Senior unsecured bonds issued by DNB do also have a greater liquidity in the second hand market than bonds issued by the other banks. The fixed effect model would control for these time-invariant individual effects. The fact that DNB is a sized and named bank would be considered a time-invariant difference between the banks and would therefore not be taken into account. As one of our predictive variables is size, the fixed effect-model would only emphasize on how an individual banks growth in size over time would affect credit spreads.

The same control counts DNB being a systematic important bank. This would also not be taken into account in this model since being systematic important is time-invariant in our research period.

The fixed effect model adjusts for all these unobserved effects by eliminating them from the regression function. This allows the model to fully access the predictor variables net effect on the dependent variable. However, these characteristics may impact either the dependent or independent variable. Therefore we will also assume that there is a correlation between the banks error term and the predictor variables used in our task.

The individual characteristics of DNB do not correlate with any other banks. That the individual characteristics of one entity (bank) not correlate with any other individual characteristics in other entities, that they are unique, is an important assumption in the fixed effect model. If the individual characteristic were to correlate with each other the fixed effect model would not be suitable for the research. The inferences might not be correct and we would have to model that relationship.

Not taking into account time-invariable effects could contribute to weaknesses in using the fixed effect model in our analysis. Individual effects may play a great part in the setting of credit spreads. This will be discussed further in the presentation of our results.

Since the fixed-effect model controls for the time-invariant characteristics between the individuals we cannot bias the estimated coefficients from the model. This is another critic of using the fixed effect model

We have chosen to use five predictive variables in our task. An increase use of predictive variables in our data set will increases the noise in our data set increases as well. We will suffer a trade-off between adding more predictive variables and the noise it introduces. We will therefore test our fixed effect model conducting several tests excluding one or several predictive variables to see if it gives or study a more explanatory power.

## 7.8 Results

In this chapter will we present the results from our research made on the five independent variables used to estimate the dependent variable, which are the credit spreads. Further in the chapter we will discuss the results with respect to our predicative variables.

We have conducted several fixed-effect regressions on our set of panel data. While testing or variables we did also introduce a financial crisis dummy. We have tested our predictive variables against the credit spreads both with and without the financial crisis variable.

The first set of results shows our predictive variables tested against the credit spreads. We have used a financial crisis dummy from the year of 2008 to and including 2012. The results are shown in table 10.

| Credit Spread | t- value | P>|t| |
|---|---|---|
| size, x1 | 2,71 | 0,011 |
| Encumbrance, x2 | 2,68 | 0,012 |
| Balance Composition, x3 | -1,23 | 0,228 |
| Profitability, x4 | -2,6 | 0,014 |
| Capital Adequacy, x5 | 1,6 | 0,12 |
| Financial crisis dummy | 8,03 | 0 |
| Constant | 3,85 | 0,001 |
| F(6,30) | 156,09 | |
| Probability > F | 0 | |
| R-squared | 0,969 | |
| Corr (u_i, Xb) | -0,666 | |

*Table 10 Fixed-effect regression with financial crisis dummy in 2008-2012.*

This test shows a high explanatory power with an r-squared of 0,969. The size, the degree of encumbrance and profitability given by ROE has significant effects on the dependent variable; credit spreads, within a 95 % confidence interval. However, Size has an coefficient of 0,00211 which is too low for it to have an significant effect on the credit spreads. Profitability had a coefficient of -4,049, while encumbrance had an coefficient of 2.32.

The financial crisis dummy has a t-value of 8.03 and gives us confidence that the credit spreads are affected by the financial crisis.

Doing the same test while using the financial crisis dummy from 2007 to and including 2012 shows some different results. Table 11 shows the results from this test.

| Credit Spread | t- value | P>| t | |
|---|---|---|
| size, x1 | 1,77 | 0,087 |
| Encumbrance, x2 | 3,57 | 0,001 |
| Balance Composition, x3 | -0,54 | 0,595 |
| Profitability, x4 | -5,21 | 0 |
| Capital Adequacy, x5 | 1,54 | 0,13 |
| Financial crisis dummy | 3,94 | 0 |
| Constant | 2,6 | 0,014 |
| F(6,30) | 72,69 | |
| Probability > F | 0 | |
| R-squared | 0,9356 | |
| Corr (u_i, Xb) | -0,6756 | |

*Table 11 Fixed effect regression with a financial crisis dummy in 2007-2012*

This test does as well have a high explanatory power with an r-squared of 0,9356. It shows that the degree of encumbrance and profitability has a significant affection on the credit spreads at the 95 % confidence level. Profitability has a high coefficient of -9,487, while encumbrance had an positive coefficient of 4,211 points.

The financial crisis dummy observes a lot of noise in the data. We have conducted the fixed effect regression without the use of the financial. Table 12 shows the results from the test without the use of the financial crisis dummy.

| Credit Spread | t- value | P>\| t \| |
|---|---|---|
| size, x1 | 1,84 | 0,075 |
| Encumbrance, x2 | 3,29 | 0,002 |
| Balance Composition, x3 | -0,72 | 0,478 |
| Profitability, x4 | -6,32 | 0 |
| Capital Adequacy, x5 | 1,6 | 0,12 |
| Constant | 2,55 | 0,016 |
| F(5,31) | 57,25 | |
| Probability > F | 0 | |
| R-squared | 0,09023 | |
| Corr (u_i, Xb) | -0,7461 | |

*Table 12 The fixed effect regression without the financial crisis dummy.*

The results are not significant different from the tests with the financial crisis dummy. Encumbrance and profitability had significant effects within the 95 % confidence interval on the credit spreads. The coefficient of encumbrance was at 4,2 points, for profitability -9,48 points.

## 7.8.1 Excluding DNB from our sample

The largest bank in our sample is by far DNB. Due to its size and systematic importance it distinguishes itself from the other banks. We have therefore conducted the exact same fixed effect regression tests on the five remaining banks. The five remaining banks are in many ways more similar to each other and create a more equal data set eliminating some of the individual characteristics that DNB has. .

The test shows a significant drop in the t-values of both size and encumbrance. Profitability was only the significant variable in all tests. The coefficient was on -5 to -10 points. Capital adequacy was only significant on the 95 % confidence level on one test including the financial crisis dummy from 2007 to 2012. However it had a positive coefficient of 14 points.

All regressions showed a significant drop in the t-value for size and encumbrance as variables. Profitability and capital adequacy stands out with t-values within the 95 % level confidence in all of the regressions.

## 7.9  Results with respect to each variable

### 7.9.1  Predictive Variable 1 – Size

The results from our tests indicated that changes size did not have cause for changes in the credit spreads.

In the regression tests including DNB size tested as a significant variable within the 95 % confidence level only when using the financial crisis dummy in the years from 2008 to and including 2012. However, the coefficient in this test indicated a low level of effect. In the tests conducted with other time periods for the use of the financial crisis dummies and the test conducted without DNB indicated that size had no cause for changes in the credit spreads.

Throughout our data set of spreads, which are from 1999, DNB has had lower credit spreads than the remaining banks in our test sample. In other financial markets it is also observed that greater sized banks achieve lower credit spreads than smaller ones.  One should therefore argue that size has an affection of the credit spread. This will be discussed further on.

Since the fixed effect model are designed to study the causes for changes within our banks the model might have difficulties picking up the size-effect. The model will focus on how the change in size causes changes in the credit spread. We could argue that the level of size matters more than the change in size. The fixed effect would not take into account the starting level of size in a bank. The level of size would be a time-invariant individual characteristic and would therefore not show significant values in our research. The same counts for systematic importance, as a bank becomes systematic important it often stays like that for a long time and it could therefore be characterised as a time-invariant individual characteristic.

Our study could prove that changes in size have no effect on the credit spreads over a short period of time. However, the level of size a bank has might have a great impact on the credit spreads a bank achieves in the credit markets.

### 7.9.2  Predictive Variable 2 – Degree of encumbrance

The results from our tests on the whole data panel indicated that changes in the level of encumbrance had a significant cause for change in the credit spreads. In both the tests conducted with and without the financial crisis the change of level in encumbrance had a effect on the credit spreads within the 95 % confidence level. A higher degree of encumbered assets

gave a higher credit spread. The coefficient from given in the tests was positive and had high values of 4 points and higher.

While conducting the fixed effect tests excluding the data from DNB none of the test results showed that changes in the degree of encumbrance had a significant effect on the credit spreads on a 95 % confidence level.

The results from our tests are very uncertain, and we cannot conclude with high confidence weather the changes in the degree of encumbrance causes changes in the credit spreads. We will discuss this further in chapter eight were we shortly compare the encumbrance and spreads of other Nordic banks with the sample of our banks.

### 7.9.3  Predictive Variable 3 – Balance composition

None of our tests showed that changes in the balance composition had a cause of changes in the credit spreads within a 95 % confident level.

However, the changes in balance composition could somewhat be reflected by the degree of encumbrance, which is given by variable 3. The correlation between the grade of encumbrance and the balance sheet composition is at 0.843 which lead us to conducting a test excluding the grade of encumbrance to study if changes in the balance composition caused aa change in the credit spreads. The results of the test showed an increase in the t-values, but not to the 95 % confidence level.

From our study we can conclude on the fact that changes in balance composition does not cause a change in the credit spread over the short term.

### 7.9.4  Predictive Variable 4 – Profitability (ROE)

All the tests conducted on our data sample indicated that an increase in profitability caused lower credit spreads. In all tests they got high t-levels which indicate that we can with a high confidence say that the profitability has a cause on changes on the credit spreads. The coefficients given in the results shows high values at 4 points and exceeding in the all the tests including DNB, when removing DNB the coefficient values doubled.

Profitability in itself is a uncertain measurement. Profitability is the sum of several different characteristics of a bank. It contains factors like how much income it is generating and at

which level their costs are at. It does also tell us about the amount of losses a bank is experiencing. Banks with higher risk would experience higher volatility in losses and therefore also a higher volatility in its profitability. However, a high profitability tells the market something about a bank's ability to pay interest rates and principals on its debt. In periods of severe financial turmoil will a higher profitability give a bank the ability to retain its profits and build equity.

Using return on equity (ROE) is also affected by the amount of equity a bank is holding. For a given earnings, the ROE would increase with a lower share of equity. A lower share of equity would give a higher risk for the remaining holders in a bank's capital structure which again could lead to higher capital structure.

Higher credit spreads have an affection on the lending costs for a bank, and therefore also the profitability of a bank. This could lead to a question about causality between the independent and dependent variable. Would changes in the credit spread cause changes in the profitability before the changes in profitability changes causes changes in the credit spread? The answer is no. The margins on the credit loans are fixed on each loan, so changes in the credit spread over a short period of time would only affect the banks funding which are refinanced at that point. It would be then be a time-delay from the change in the credit spread occur to it will affect the probability.

Research from Nordea Markets[22] indicates that banks with a higher ROE have a greater pricing of its equity given by the price-to-book value in the financial markets. A bank with a greater price-to-book value would have a higher cost of its equity and are therefore in a greater position in the financial markets when issuing new equity which it might be required to in cases of financial turmoil. This could be insuring for the remaining investors in the capital structure, including holders of senior unsecured debt. This will be discussed further in chapter eight.

From our study we can conclude that an increase in the profitability given by the ROE is causing a decrease in the credit spreads.

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[22] Research conducted in 2013 (Nordea, 2013)

### 7.9.5 Predictive Variable 5 – Capital Adequacy

The tests conducted in our data sample indicated different results on the changes in capital adequacy's cause on changes in the credit spreads. When conducting the tests with all banks included in the test sample capital adequacy indicated no significant cause on the 95 % confidence level. Conducting the tests without DNB gave a significant cause for change when adding the financial crisis dummy in the years 2007 to 2012. More surprisingly was it that it the coefficient was positive indicating that a higher capital adequacy caused higher credit spreads. Theoretically would a higher capital adequacy give a higher share of loss absorbing capital and more protection for the banks general creditors which include owners of senior unsecured debt.

The capital adequacy ratio has a link between the banks ROE. Equity accounts for the greatest share in the capital adequacy. Given all else equal; a higher share of equity would give a higher capital adequacy, but a lower return on equity.

Our study cannot with a high confidence indicate that changes in the capital adequacy has a cause for changes in the credit spreads.

## 7.10 Summary

The most significant finding in our study was that changes in profitability given by the return on equity caused changes in the credit spread. An increase in the return on equity gave a decrease in the credit spreads. All tests indicated that profitability had a significant cause for change on the 95 % confidence level. The coefficients varied between – 5 points to – 10 points indicating that a percentage higher ROE gave a decrease in five to ten basis points in the credit spreads.

Profitability given by the ROE is a measurement affected by several different characteristics in a bank, including income, costs, losses and the level of equity. However, a high ROE is appreciated by equity investors and a high appreciation in the equity markets could give insurance for the remaining investors in the capital structure.

The second most significant variable was that a change in the degree of encumbrance of the total balance caused changes in the credit spreads. An increase in the encumbered assets gave an increase in the credit spreads. However, when removing DNB from our test panel, a change in the degree of encumbrance no longer showed a significant cause of changes in the credit spreads.

Changes in size, the capital adequacy and the composition of the balance remaining in the parent bank showed no significant cause of change for the credit spreads in senior unsecured bonds.

A banks profitability given by the ROE is not affected by the encumbrance and changes in the balance sheet directly. From the results in our study we could therefore argue that the increased use of covered bond companies and the changes in the balance sheets remaining in the parent bank not has a significant effect on the credit spreads of senior unsecured bonds.

## 7.11 Criticism

We could criticize our analysis on several points. The first point is the time frame in our analysis. The first covered bond company was established in 2005. However, the use of covered bond companies did not really increase to a matter before 2007 when the Norwegian covered bond legislation was implemented. This gives us a short time frame and a limited panel of data to analyse.

The Norwegian market might also not have taken into account the changes that have happened in a bank's capital structure. It could take time for the market participants to adopt the changes in the capital structure. The investors may be in a "wait-and-see" modus, not really knowing how to price the new senior unsecured bonds compared with the pricing before. Many of the investors in senior unsecured bonds are either mutual funds, pension funds or other large institutional clients who "have" to own senior unsecured bank bonds. One reason might be the investment requirements framework they work under, another reason might be the supply/demand of these bonds. A limited supply of senior unsecured bonds could decrease the price. We will discuss this further in chapter eight.

Using a fixed effect regression we would try to study the causes of changes in the credit spread. The fixed-effect analysis would also control for all time-invariant characteristics of an

individual bank. However, we would need to do a more comprehensive analysis of these individual characteristics to get a deeper insight into what really causes changes in the credit spreads. Some of these characteristics will be studied in chapter eight.

Some criticism may also be pointed at our data set of the dependent variables; the credit spreads of the senior unsecured bonds. We have gathered data from different brokerages and Norges Bank. However, the prices are indicative prices in the second hand market. In times of severe financial turmoil and a lack of liquidity in the markets one might have difficulties setting the prices.

The time frame for our study is including a period where several outside factors have been affecting the financial sector, the banks and the prices of senior unsecured debt. Both the financial crisis and the euro-debt crisis have led to an increase in risk premiums for all financial instruments. In addition to this banks must face political uncertainty and a new financial framework.

### 7.11.1 Further research

All these factors indicate that a set of fixed-effect tests not gives a comprehensive enough analysis to understand what is driving the prices in the senior unsecured bond market. We will therefore, in addition to our quantitative approach, analyse what might cause changes in the senior unsecured bond prices in a qualitative approach.

In the next chapter we will discuss further alternative factors that might or might not have caused the changes in the senior unsecured bond prices. We will first discuss factors that are related to our findings in the quantitative research. Further we will discuss additional factors that might play an important role.

## 7.12 Discussion of other effects

In this chapter we first off will discuss different approaches to our findings in the quantitative research. We will compare the findings from our analysis with characteristics from different banks operating in different countries, and try to evaluate our results from a different point of views.

Further we will discuss other factors that might play an important role in the pricing of senior unsecured bonds. In the end we will look at different factors that might play an important role in the future pricing of covered bonds.

## 7.13 Alternative discussion to our findings

### 7.13.1 Size

In our study we observed that changes in the size did not cause changes in the credit spreads on a significant level. However, we observe that greater sized banks often achieve lower credit spreads in the financial markets. In our data set, going back from 1999, we observe that DNB has had a lower credit spread on its senior unsecured prices during the period.

Market participants argue that DNB achieves lower credit spreads for two reasons. The first reason is that the size and systematic importance DNB has in the Norwegian Bank Market. DNB plays an important role in the financial sector in Norway. Almost every participant in the financial sector has DNB as counterparty in some way. A bankruptcy of DNB would therefore be severe for the whole financial sector. The second reason is that DNB reaches a broader spectre of investors which creates a higher base for demand for their issued bonds. These two factor correlates to some extent. A sized bank will be systematic important and at the same time be forced to reach broader investor spectres. One third reason that can argue for the lower spreads of DNB is the Norwegian Governments 34 % ownership in the bank.

Over the last several decades the financial system has become more complex and the banks have increased in size. Banks have become of such a great size that a single bankruptcy cold cause a severe financial turmoil and lead to an economic downturn (BIS, 2012).

Asli Demirgüc-Kunt from the World Bank and Harry Huizinga from CEPR (2012) did a research on banks size and its cause on performance, strategy and market discipline. Their results shows that a bank which is "too big to fail" (of a great systemic importance) experiences lower funding costs if the bank operates within a nationality that has an ability to save the bank in case of a bankruptcy. The case for DNB fits well in this description. DNB is a bank which can be considered too big to fail by many market participants. The Norwegian government has a solid financial position and will be prepared to save the bank if necessary. According to Demirgüc-Kunt and Huizinga this could lead to a decrease of the funding costs.

They further argue that if a bank is too big to fail and operates within a nationality that could have difficulties saving the bank it could experience higher funding cost.

Schich and Kim (2012) discussed this phenomenon in the OECD Journal of Financial Trends. They argued that the market expected a high implicit guarantee in banks that were stationed in a nationality with a high financial strength. Further they saw the value of this implicit guarantee decreasing sharply as the sovereign strength decreased.

A nation's willingness to save the banks is also an important factor. An example of this is the Danish governments approach to distressed banks in the aftermath of the financial crisis in 2008. Moody's investor services (2011) argued that all Danish banks would suffer a long-term rise in funding costs after the regional bank Amagerbanken A/S failure in February 2011. This failure triggered the first loss of senior unsecured creditors in the European Union.

### 7.13.2 Profitability

All tests in our study indicated that changes in profitability given by ROE had an significant cause of changes in the credit spreads. An increased ROE gave a decline in the credit spreads. As earlier mentioned, ROE is a measure capturing several different characteristics within a bank.

One reason for the relationship between the ROE and the credit spread can be the degree of losses. As owners of senior unsecured bonds, by definition, only are exposed for losses if a bank defaults they would be worried by the amount of losses a bank experiences. Economically, increased losses would both increase the risk of a bank default and decrease the ROE given all else equal.

A higher ROE may also increase investors' confidence in a bank. Research conducted by Nordea Markets indicates that banks with a high ROE are traded on higher price to book value levels. The relationship is shown in figure 21. The price to book value level is a measurement that shows how the market prices a bank of its book value. It is given by the market capitalization of the bank which gives the markets pricing of a bank's equity divided by the book value of its equity $\frac{Market\ price\ of\ equity}{Book\ value\ of\ equity}$. A price to book value level greater than one indicates that the markets prices the equity in a bank higher than the books indicates, a level

lower than one indicates that the markets are pricing the equity with a discount to the book values. A high price to book value is often seen in relation to a high valuation of a company
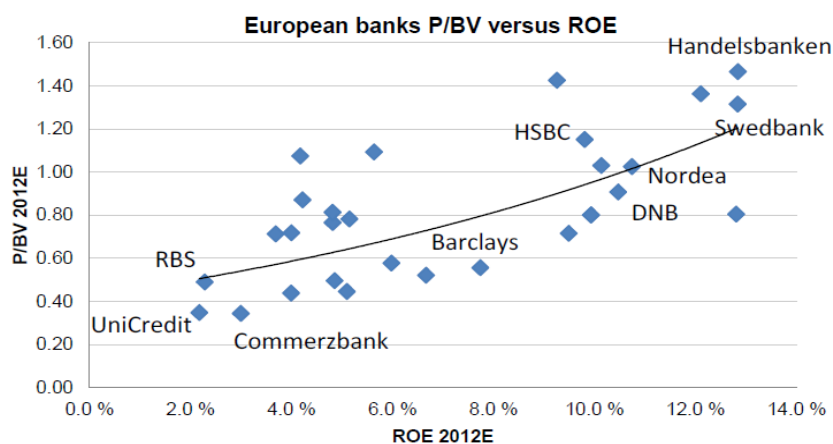


*Figure 21 Price/Book Value versus ROE on European banks (Nordea, 2013).*

Investors in senior unsecured bonds might appreciate a high stock market valuation of a company. First of all, a high stock market valuation indicates that the financial markets believe in the future of the company. Second of all, management are more comfortable issuing new equity at high valuation levels. At high valuation levels, the cost of equity is low which could give an incentive to rise equity.

## 7.13.3 Encumbrance

We found that encumbrance had a significant effect in some of the tests. The case of encumbrance in banks has had an increasing attention in the markets in the past few years.

As the financial crisis led to a loss of confidence in banks unsecured bank bonds became an unpopular investment among investors. This led to an increase in the use of covered bonds hence increased encumbrance

Market participants have had a different view on this. Dr. Steffen Meusel from the Financial Supervisory Authority of Germany (2012) argues that a high encumbrance would have a detrimental effect on the unsecured creditors of the bank, hence the holders of senior unsecured bonds. All else equal, increased encumbrance would increase the loss given default. Dr. Meusel further argues that the increased use of covered bonds in relation to unsecured bonds

could more exposed to bail-in plans meaning that senior unsecured bond holders would not be fully saved in the case of an bankruptcy.

Longdon (2012) discussed in a paper that senior bonds would become more equal to subordinated bonds due to the increased encumbrance and that the loss given default most likely has increased. They also discuss how an increased use of covered bonds might increase the risk for a bail-in for senior unsecured creditors.

Longdon (2012) argues that all though the loss given default has risen, the probability of default has decreased given a lower funding and liquidity risk. They further discuss the treat for a possible subordination of senior unsecured bonds to depositors in case of a default.

Most market participants argue that the risk has increased for senior unsecured debt holders due to the increased encumbrance. However, they are all awaiting a resolution on how the owners of senior unsecured debt are treated in the case of a default. In the next section we will discuss this further.

## 7.14 Crisis resolution and government interference

During the financial crisis the government backed banks that experienced severe turmoil. Governments intervened both indirectly by stimulating the credit and money markets and directly by lending directly to the banks. In Norway banks were allowed to swap covered bonds in exchange for state issued certificates which would give them liquidity. Banks were also search the States Finance Fund for funding in more risky assets like tier one bonds or equity.

In the aftermath of the financial crisis and the bank crisis European authorities have started working on a resolution on how to manage a bank failure. The result of this resolution would play an important part for holders of senior unsecured debt. There are several arising questions due to this resolution. When would the government let a bank go bankrupt? Would the holders of senior unsecured debt be bailed in or out? If not, would they be subordinated to depositors? And, would the government take into account the degree of encumbrance?

The governments intervene with the banks made a lot of banks get through the crisis. By the end of 2009 many banks were back on their own feet and were making money again. The amount of banks which has failed was low. Fitch (2012) reported that the five year cumulative

default rate of banks was very low at only 0,9 %. Further on, they reported that the rate of banks that would have defaulted without government help would be as high as 7,1 %. There is therefore clearly that governments support is reducing the risk for senior unsecured debt holders. A resolution proposing a bail-in would lead both a higher default rate of banks and a higher loss given default for unsecured bond holders.

One could therefore with a great confidence say that a resolution which includes bail-in policy of the banks senior unsecured debt holders would increase the expected loss of senior unsecured bond holders and so on the credit spread for senior unsecured bond holders (Longsdon, 2012).

The government has taken a lot of criticism from the masses since it has helped the banks. A broad view of the public masses is that bank's should been let go to a greater extent. However, letting a bank go and making senior unsecured debt holders take a loss might have great social economic costs. After the Danish government made senior unsecured bond holders take a loss in Amagerbanken in 2011 costs of funding went up for all banks (Moody's, 2011) which again made credit expensive for the broad masses of Denmark.

The European commission have started working on aa resolution. However, there is given little or no signals on what the resolution would look like.

## 7.14.1 Depositor preferences

Deposits not guaranteed by any deposit insurance do currently have the same priority in the capital structure as senior unsecured debt. That means that depositors have the same amount of credit risk as a holder of senior unsecured bonds. The liquidity risk is lower since deposits can be removed at a short notice and does not need to be sold in the markets. Dhami and Jones (2013) argue that a potential depositor's preference indicates a larger threat to owners of senior unsecured debt than the encumbrance. If senior unsecured debt becomes subordinated to depositors one would witness a whole new repricing of senior unsecured bonds. CreditSights (2012) discusses the structural subordination of senior unsecured bonds and argues that it would have a higher on senior unsecured bond holders than the level of encumbrance. Fitch (2012) argues that a possible depositor's preference must be seen in context with encumbrance and that a subordination of senior unsecured bond holders to depositors would make the senior unsecured debt holders more disciplining on banks in relation to their encumbrance.

During the late financial turmoil on Cyprus depositors not covered by the deposit guarantee were required to take a loss. At one level in the negotiations one proposition even suggested that guaranteed depositors would take a loss. This created a lot of turmoil among the masses in Cyprus. How the Cyprus Bank crisis was handled was criticised from many parties, among them the ECB. This underlines the importance of having a solid and clear resolution for handling a bank default.

As mentioned earlier, Norwegian depositors are guaranteed deposits of NOK 2 million by the Guarantee Fond. For those depositors with more than NOK 2 million, this problem can be solved by limiting the deposits in each bank to NOK 2 million. In 2011 the Norges Bank and FSA stated: *"Norges Bank and Finanstilsynet share the view that statutory bail-in may be a suitable tool for recapitalising a bank, or parts of a bank, when a recapitalisation is deemed necessary to sustain access to essential services"*. They further argue: *"The possibility of bail-in may force also large banks to pay a price for their debt that to a greater extent reflects the underlying risk of the banks."* In other words, the government is using the risk of bail-in as a way to discipline the banks with the help of the market.

The outcome of a bankruptcy resolution for banks would play an important role in the future for senior unsecured bonds. Both the risk and pricing could be drastically changed. Several factors are pointing to the direction of a bail-in and that owners of senior unsecured bonds will carry a larger burden in case of a default. If this occurs it could change the entire funding structure and operation structure of a bank.

## 7.15 Supply/Demand Balances and the Clientele effect

Prices in the financial market are, as in most other markets, heavily affected by the supply and demand for the loans given. The introduction of covered bonds has both attracted new investors and allowed investors to hold a greater deal of bank related bonds. While investors earlier on could invest in senior unsecured bonds or subordinated bonds they now have a safer alternative to invest in.

Covered bonds issued by the covered bond companies in our study do all have a tipple-A (AAA) rating by an official rating agency. This implies a very low degree of expected loss. This allows investors who search more secure investments to buy bonds issued by the bank. It

has changed the composition of the bank bond holders allowing large institutional market participants like pension funds and insurance companies to take a bigger stake in the bank.

This could be related to an effect called the clientele effect. Further in this section will we discuss this effect and how it has affected the total the supply/demand balance of a banks issued bonds.

## 7.15.1 The Clientele effect

During the financial crises, covered bonds proved to be a very popular financial security. Other financial securities, as certain government bonds and senior bonds, experienced tough time as the lack of certainty was gone. The phenomenon is called "flight to quality" and refers to the trend of investors unloading riskier investments instead of more stable ones. In order to find out how and why exactly covered bonds experienced this sudden popularity, we use the theorical framework of "The Clientele effect".

### *The Clientele effect explained*

In 1961 Miller & Modigliani defined the clientele effect as a trend for investors to buy certain stocks with a particular dividend payout. The explanation behind this is that the investors (i.e. the clientele) seek a different composition of stocks because of the various proportions of capital gains and dividends. Miller & Modigliani explained this by the imperfection of the capital market, as transaction cost and taxes. If this theory is correct it would mean that stockholders could be divided into different segments, clienteles, as tax minimization induced clientele and transaction cost induced minimization clientele.

By comparing institutional investors and investors with low income, (Allen, Bernardo and Welch, 2000) gave a good example of institutional investors choosing stocks with high dividend ratio because of the tax advantages the institutions experience. Low income investors prefer more stable stocks paying high dividend payouts since the transactions cost are too high and they rather enjoy the tax expense on the dividend payout. By this, it can be argued that the investors prefer firms which have a suitable payout policy to the firm specific situation.

*The Clientele effect on covered bonds: who are the investors?*

During the financial crises, several high rated bonds got downgraded from investment grade to non-investment grade hence triggering investors operating under certain quality restrictions to sell. This led to a change of investors and in that way leading to a clientele change. Even though the amount of highly graded bonds fell, the investors still had requirements to meet and started so seeking other securities that could meet their requirements.
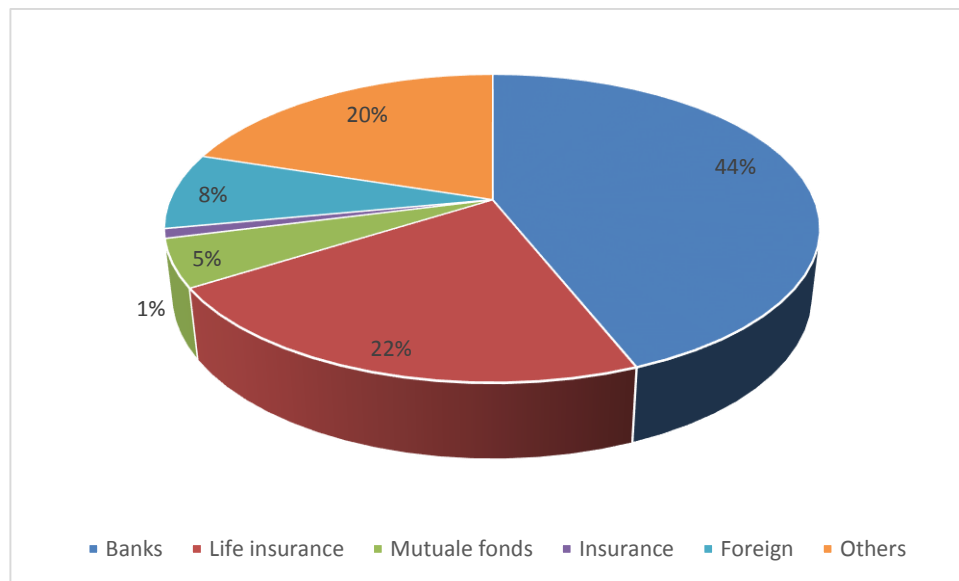


*Figur 22 Distribution of Norwegian Covered Bonds issued in Norway*
*(Baltzersen, 2013)*

By looking at the distribution of covered bonds issued in Norway, we get a deeper understanding of who is holding the bonds. Somewhat surprisingly, we found that most of the bonds are owned by other Norwegian banks (44%). In conversations with different bankers and life insurance companies it came clear that the reason behind this was the indeed the clientele effect: the covered bonds could offer as a diversified investment being both a safe and long term investment.

As of 17th January 2012 55% of a total of NOK 661 billion was denoted in Norwegian kroner. To make Norwegian covered bonds more preferable for foreign investors, the credit institutions started issuing covered bonds denoted in different currencies. By issuing bonds in foreign currency and hence eliminating the currency risk for foreign investors, Norwegian credit institutions approached a new kind of clientele.
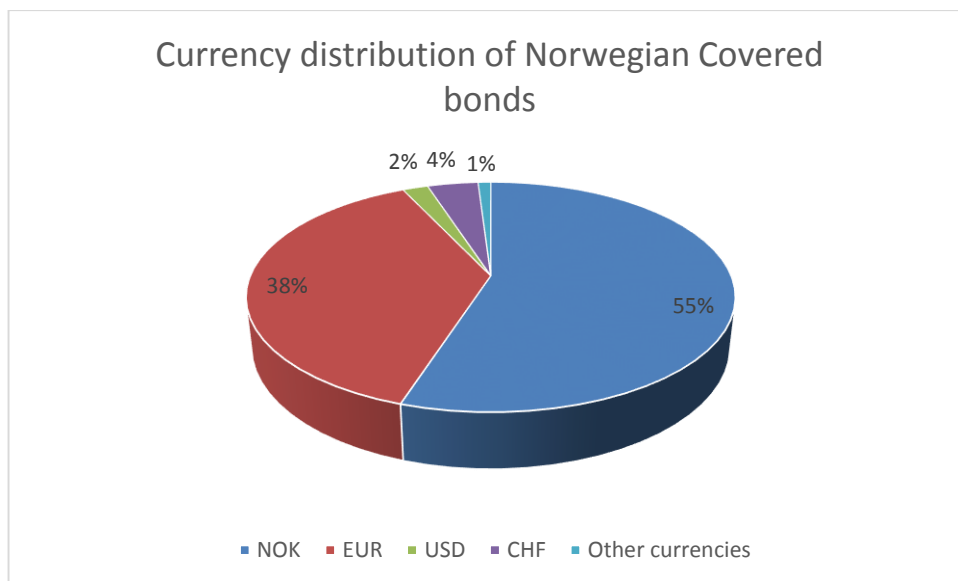
*Figur 23 Currency distribution of Norwegian Covered bonds (Stephansen, 2012).*

Covered bonds offering high transparency and high recoveries while the safety of covered bonds is backed by regulations having a privileged treatment in different areas of the EU financial market (as low risk-weights), encourages institutional investors to engage themselves more in this highly regulated market. Since the nature of covered bonds has the housing market as the underlying asset and a strong bondholder protection, the covered bonds are quite different from the corporate bonds or government bonds. This makes them a unique diversification investment.

## 7.16 Regulatory Arbitrage

By regulatory arbitrage we mean the structuring of a financial product in such a way that it brings the lowest regulatory burden when it comes to terms of administrative burden or that it surpasses a regulatory regime. Regulatory arbitrage has been labeled as a way of exploiting loopholes in the law. Merton Miller (1986) said that "The major impulses to successful innovations over the past twenty years have come, I am saddened to have to say, from regulation and taxes". As new regulation comes, new, innovative ways to utilize the regulation show up. Siegelaer and Walhof (2007) divide regulatory arbitrage in three parts

- Evading a regulatory requirement within the same regime
- Shifting to another regulatory regime
- Flying beneath the regulatory radar

More regulations lead to more exposure towards regulatory arbitrage. When Basel II was introduced it led to several capital requirements to the different types of assets, hence leading to the creation of Special Purposed Vehicle (SPV). The Basel II framework required the banks to hold capital better aligned with the risk profile of their portfolios. This meant that the banks were required to hold more capital the higher the risk of their loans were. By transferring the loans to the SPV the banks got rid of the high risk loans. Greenbaum and Thakor (1987) stated that the better quality assets will be sold (securitized) while the low quality assets will be funded by deposits under asymmetric information and without government intervention. The introduction of Basel II proved them right.

This is different from the Norwegian way of securitize mortgages. Instead of securitize the mortgages with the highest risk, Norwegian banks securitize the mortgages with the lowest risk, hence getting a better credit rating, making the funding cheaper.

This argues that banks issue covered bonds / Asset-backed securities to obtain liquidity. By doing this, they transform illiquid or liquid assets into liquid instruments. ABS is then used to arbitrage the capital requirements of the banks. At end they securitize to change the risk profile of their portfolio and to transfer risk and/or arbitrage requirements (Martín-Oliver and Saurina, 2007).

As regulatory arbitrage has a tight bond to regulation, there will always be regulatory arbitrage.

# 8. Future of senior unsecured bonds and covered bonds

There are several regulatory and political factors that could affect the future of senior unsecured bonds and covered bonds. In this section we will briefly go through these factors and how it might affect the supply and demand of them.

The first factor is the regulatory changes that were introduced in Basel three. The introduction of the liquidity coverage ratio ($LCR = \frac{Stock\ of\ liquid\ assets\ of\ high\ quality}{Net\ outflow\ next\ 30\ days} \geq 100\%$) would require a bank to hold a set of high quality assets in their liquidity portfolio. The Norwegian authorities have indicated that covered bonds with an AAA and AA rating would have high weights in the LCR ratio. This would increase the banks demand for covered bonds. This indicates that the banks own holdings of covered bonds will rise in the future.

Another regulatory factor is the regulatory framework for insurance companies called Solvency II. This is a proposed regulatory framework that regulates an insurance company's portfolio. Covered bonds with an AAA and AA rating achieve a very low risk weight under the latest proposal. It gives the insurance companies an ability to hold larger amounts of bank debt.

These specifics in these two regulations are just propositions yet, and we don't know how the final result will be. However, a lot of factors are indicating that regulatory requirements will create a larger demand for covered bonds in the future.

The Norwegian Financial Authority (FSA) has commented on some new risks arising due to the increased use of covered bonds; how an increased use of covered bonds have increased credit growth towards households and how this exposes the banks in the case for a drop in real estate prices.

In order to protect the senior bondholders and depositors, several countries have determined that the value of outstanding covered bonds must not exceed a certain percent of the issuer's total assets. The FSA is discussing the possibility of imposing Norwegian banks a qualitative standard, assessing each credit institution for themselves. The FSA will then monitor banks' own assessments of the risks associated with the transfer of mortgages through assessment of

risk, risk management and capitalization. We believe this will further increase the demand for covered bonds.

As we earlier discussed, a final resolution of a bank bankruptcy will play an important part in the future of both covered bonds and senior unsecured bonds. The market participants are most likely waiting for this resolution to determine how senior unsecured bonds are treated in the case of a bankruptcy.

# 9. Conclusion

Covered bonds were initially introduced primarily to ensure Norwegian banks a higher level of diversification of assets and lower funding cost. In our study we find this becoming a reality: Funding has become cheaper and mortgages has become a new investment product in the shape of covered bonds.

Banks are using the mortgages as both as an investment product by buying others banks covered bonds and by financing themselves, hence making banks clearly exposed to the housing market. This has led to the backdrop of our thesis: how are the senior bondholders affected and how do they react to this change of risk? Our findings indicates a higher exposure towards the business market as corporate loans are a bigger part of the banks' assets than before. Since the corporate loans are seen as riskier than household loans, the senior bondholders should demand a higher return than they did before the exposure.

By examining senior credit spreads we find that the spread has increased, indicating a response to the change of risk. In order to understand which factors influencing the spread, we find that return of equity (ROE) and level of encumbrance are the two significant factors predicting the credit spread. We have found no evidence that size has an impact on the credit spread.

The demand for Norwegian covered bonds has been high. We have found different causes behind this. The covered bonds have attracted a special sort of investors looking for a safe investment. The credit agencies have played a big role in this, because by deciding the rating they have attracted the institutional investors.

Covered bonds are undoubtedly here to stay. As banks will continue to increase their encumbrance, more will be required of the bank depositors and the covered bond owners as part of their elevated risk. Authorities such as the Norwegian FSA will surely find ways to apprehend this, either by a qualitative or a quantitative standard.

# 10. Appendix

## 10.1 Datasheet based on the annual reports

| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | |
|---|---|---|---|---|---|---|---|---|
| All numbers in bnNOK | | | | | | | | |
| **DNB** | | | | | | | | |
| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | |
| Total Assets (Parent incl loans to CBC) | 1105,13 | 1249,63 | 1638,21 | 1616,00 | 1637,64 | 1884,95 | 2013,41 | |
| Total Assets (Parent Bank) | 1067,31 | 1164,32 | 1476,21 | 1435,28 | 1472,08 | 1615,17 | 1736,79 | |
| Liabilities and equity | | | | | | | | |
| Market financing (parent + loans to CBC) | 326,81 | 371,78 | 614,18 | 500,91 | 509,45 | 713,27 | 640,28 | |
| Market financing (parent) | 324,18 | 335,77 | 507,68 | 342,76 | 398,23 | 384,47 | 415,00 | |
| Senior financing ratio in % of parent bank | | | | | | | | |
| Deposits in parent | 510,75 | 510,75 | 570,31 | 580,91 | 624,59 | 750,10 | 819,95 | |
| Deposit ratio % in parent bank | | | | | | | | |
| Assets | | | | | | | | |
| Total lending to customers (group) | 838,02 | 980,24 | 1206,84 | 1114,89 | 1170,34 | 1291,66 | 1308,86 | Note 7 |
| Total lending to customers (parent) | 722,88 | 763,47 | 824,22 | 626,81 | 669,45 | 711,97 | 713,74 | Note 7 |
| Commercial lending (parent) | 363,48 | 441,41 | 582,53 | 481,50 | 534,73 | 594,23 | 583,25 | Note 7 |
| | | | | | | | | Note 7 |
| Household lending (Group) | 417,59 | 456,07 | 498,85 | 531,76 | 559,06 | 599,94 | 647,59 | Note 7 |
| Household lending (parent) | 359,40 | 322,06 | 241,69 | 145,31 | 134,72 | 117,73 | 130,49 | Note 7 |
| Loans transferred to CBC | 22,95 | 90,01 | 198,48 | 337,11 | 397,64 | 463,62 | 519,36 | |
| Liquidity portfolio (Parent) - Certificates and bonds at market price | 137,30 | 82,06 | 112,27 | 280,42 | 304,95 | 244,34 | 241,73 | Balance |
| Liquidity portfolio ratio % in parent | 0,13 | 0,07 | 0,08 | 0,18 | 0,21 | 0,15 | 0,14 | |
| | | | | | | | | |
| **Key numbers to our task** | | | | | | | | |
| % - Encumbered assets (lending in CBC/ Total assets group) | 0,021 | 0,072 | 0,121 | 0,209 | 0,243 | 0,246 | 0,258 | |
| Corp lending/Household lending in parent bank | 1,011 | 1,371 | 2,410 | 3,314 | 3,969 | 5,047 | 4,470 | |
| Commercial lending as % in parent bank (corp lending/total assets parent) | 0,341 | 0,379 | 0,395 | 0,335 | 0,363 | 0,368 | 0,336 | |
| % of total Household lending transferred to CBC | 0,055 | 0,197 | 0,398 | 0,634 | 0,711 | 0,773 | 0,802 | |
| Return on equity (ROE) | 18,2 % | 19,7 % | 14,0 % | 10,0 % | 13,9 % | 13,5 % | 11,3 % | |
| Capital ratio (parent) | 10,2 % | 10,5 % | 9,9 % | 11,4 % | 11,7 % | 11,5 % | 12,4 % | Note 4 |
| | | | | | | | | |
| **SPV** | | | | | | | | |
| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | |
| Total Assets (Parent incl loans to CBC) | 60,23 | 75,05 | 94,89 | 97,66 | 105,28 | 115,99 | 127,83 | |
| Total Assets (Parent Bank) | 60,17 | 75,01 | 95,02 | 96,91 | 96,96 | 93,58 | 96,95 | |
| Liabilities and equity | | | | | | | | |
| Market financing (parent + loans to CBC) | 21,06 | 27,14 | 34,25 | 29,73 | 37,06 | 44,61 | 50,75 | |
| Market financing (parent) | 21,06 | 27,14 | 27,14 | 28,40 | 26,38 | 19,81 | 21,40 | |
| Senior financing ratio in % of parent bank | | | | | | | | |
| Deposits in parent | 31,12 | 37,66 | 41,00 | 44,97 | 48,80 | 53,22 | 60,14 | |
| Deposit ratio % in parent bank | | | | | | | | |
| Assets | | | | | | | | |
| Total lending to customers (group) | 53,45 | 64,68 | 76,24 | 82,30 | 88,47 | 99,30 | 106,79 | |
| Total lending to customers (parent) | 53,59 | 64,95 | 68,37 | 70,72 | 66,96 | 68,42 | 67,90 | Note 10 |
| Commercial lending (parent) | 11,41 | 14,86 | 21,16 | 22,27 | 23,46 | 28,21 | 28,05 | Note 10 |
| | | | | | | | | |
| Household lending (Group) | 42,12 | 50,08 | 55,27 | 60,21 | 64,90 | 73,06 | 79,11 | Note 10 |
| Household lending (parent) | 42,05 | 50,08 | 47,20 | 48,45 | 43,50 | 42,45 | 40,16 | Note 10 |
| Loans transferred to CBC | 0,00 | 0 | 8,135 | 11,89 | 21,727 | 31,10147 | 39,168944 | Note 39 |
| Liquidity portfolio (Parent) - Certificates and bonds at market price | 2,81 | 5,11 | 12,76 | 21,07 | 21,09 | 11,54 | 15,15 | |
| Liquidity portfolio ratio % in parent | 0,047 | 0,068 | 0,134 | 0,217 | 0,217 | 0,123 | 0,156 | |
| | | | | | | | | |
| **Key numbers to our task** | | | | | | | | |
| % - Encumbered assets (lending in CBC/ Total assets group) | 0,000 | 0,000 | 0,086 | 0,122 | 0,206 | 0,268 | 0,306 | |
| Corp lending/Household lending in parent bank | 0,271 | 0,297 | 0,448 | 0,460 | 0,539 | 0,665 | 0,699 | |
| Commercial lending as % in parent bank (corp lending/total assets parent) | 0,190 | 0,198 | 0,223 | 0,230 | 0,242 | 0,301 | 0,289 | |
| % of total Household lending transferred to CBC | 0,000 | 0,000 | 0,147 | 0,197 | 0,335 | 0,426 | 0,495 | |
| Return on equity (ROE) | 17,9 % | 16,2 % | 4,9 % | 8,0 % | 11,3 % | 8,7 % | 12,3 % | |
| Capital Adequacy | 10,2 % | 9,7 % | 9,1 % | 11,8 % | 11,6 % | 11,6 % | 12,6 % | |
| Rating | | | | | | | | |
| | | | | | | | | |
| **SR Bank** | | | | | | | | |
| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | |
| Total Assets (Parent incl loans to CBC) | 84,574 | 107,521 | 137,15 | 148,517 | 159,332 | 174,5 | 188,387 | |
| Total Assets (Parent Bank) | 84,277 | 102,531 | 124,92 | 123,76 | 133,47 | 129,81 | 140,17 | |
| Liabilities and equity | | | | | | | | |
| Market financing (parent + loans to CBC) | | | | | | | | |
| Market financing (parent) | 26,057 | 35,635 | 45,66 | 37,52 | 40,31 | 36,34 | 40,69 | |
| Senior financing ratio in % of parent bank | | | | | | | | |
| Deposits in parent | 43,143 | 50,995 | 54,94 | 54,51 | 60,94 | 64,21 | 67,76 | |
| Deposit ratio % in parent bank | | | | | | | | |
| Assets | | | | | | | | |
| Total lending to customers (group) | | | | | | | | |
| Total lending to customers (parent) | 74,43 | 84,44 | 94,64 | 88,30 | 100,07 | 95,28 | 102,86 | Note 8 |
| Commercial lending (parent) | 28,84 | 37,00 | 48,10 | 47,06 | 48,74 | 52,56 | 55,72 | Note 8 |
| | | | | | | | | |
| Household lending (Group) | 48,86 | 56,09 | 63,75 | 70,60 | 82,35 | 91,24 | 99,65 | Note 8/Note 100 |
| Household lending (parent) | 48,152 | 50,429 | 50,67 | 43,66 | 44,89 | 46,55 | 51,43 | Note 8 |
| Loans transferred to CBC | 0,297 | 4,99 | 12,23 | 24,76 | 25,86 | 44,69 | 48,22 | Note 8 |
| Liquidity portfolio (Parent) - Certificates and bonds at market price | 3,526 | 5,406 | 9,09 | 22,56 | 18,74 | 19,86 | 18,67 | |
| Liquidity portfolio ratio % in parent | | | | | | | | |
| | | | | | | | | |
| **Key numbers to our task** | | | | | | | | |
| % - Encumbered assets (lending in CBC/ Total assets group) | 0,004 | 0,046 | 0,089 | 0,089 | 0,162 | 0,256 | 0,256 | |
| Corp lending/Household lending in parent bank | 0,599 | 0,734 | 0,949 | 1,078 | 1,086 | 1,129 | 1,083 | |
| Commercial lending as % in parent bank (corp lending/total assets parent) | 0,342 | 0,361 | 0,385 | 0,380 | 0,365 | 0,405 | 0,398 | |
| % of total Household lending transferred to CBC | 0,006 | 0,089 | 0,192 | 0,351 | 0,314 | 0,490 | 0,484 | |
| Return on equity (ROE) | 23,10 % | 19,40 % | 8,00 % | 17,50 % | 15,50 % | 11,20 % | 12,40 % | |
| Tier two Capital (TC2) | 10,56 % | 9,77 % | 9,80 % | 11,86 % | 12,41 % | 11,44 % | 13,10 % | |
| | | | | | | | | |
| **SMN** | | | | | | | | |
| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | |
| Total Assets (Parent incl loans to CBC) | 62,87 | 73,71 | 90,95 | 98,74 | 114,20 | 121,82 | 136,29 | |
| Total Assets (Parent Bank) | 62,87 | 70,98 | 83,65 | 83,09 | 96,39 | 99,70 | 108,94 | |
| Liabilities and equity | | | | | | | | |
| Market financing (parent + loans to CBC) | | | | | | | | |
| Market financing (parent) | 21,91 | 23,95 | 28,77 | 23,36 | 27,94 | 28,15 | 30,26 | |
| Senior financing ratio in % of parent bank | | | | | | | | |
| Deposits in parent | 30,18 | 32,62 | 35,39 | 37,38 | 43,03 | 48,11 | 53,19 | |
| Deposit ratio % in parent bank | | | | | | | | |
| Assets | | | | | | | | |
| Total lending to customers (group+ loans to CBC) | 52,82 | 61,91 | 71,32 | 77,43 | 87,67 | 95,23 | 104,29 | |
| Total lending to customers (parent) | 52,82 | 59,18 | 64,02 | 61,78 | 69,85 | 73,11 | 74,94 | |
| Commercial lending (parent) | 18,92 | 23,04 | 28,64 | 32,27 | 38,05 | 40,20 | 42,32 | |
| | | | | | | | | |
| Household lending (Group) | 29,03 | 38,87 | 42,68 | 45,16 | 49,62 | 55,03 | 62,59 | |
| Household lending (parent) | 33,78 | 38,87 | 35,07 | 29,12 | 31,19 | 34,86 | 34,43 | |
| Loans transferred to CBC | 0,00 | 2,73 | 7,30 | 15,65 | 17,82 | 22,13 | 29,35 | |
| Liquidity portfolio (Parent) - Certificates and bonds at market price | 5,13 | 5,05 | 8,49 | 14,75 | 17,04 | 12,92 | 17,16 | |
| Liquidity portfolio ratio % in parent | | | | | | | | |
| | | | | | | | | |
| **Key numbers to our task** | | | | | | | | |
| % - Encumbered assets (lending in CBC/ Total assets group) | 0,000 | 0,037 | 0,080 | 0,158 | 0,156 | 0,182 | 0,215 | |
| Corp lending/Household lending in parent bank | 0,560 | 0,593 | 0,817 | 1,108 | 1,220 | 1,153 | 1,229 | |
| Commercial lending as % in parent bank (corp lending/total assets parent) | 0,301 | 0,325 | 0,342 | 0,388 | 0,395 | 0,403 | 0,396 | |
| % of total Household lending transferred to CBC | 0,000 | 0,070 | 0,171 | 0,347 | 0,359 | 0,402 | 0,469 | |
| Return on equity (ROE) | 23,70 % | 18,90 % | 11,90 % | 16,20 % | 14,60 % | 12,80 % | 11,70 % | |
| Tier two Capital (TC2) | 11,90 % | 12,10 % | 11,90 % | 13,60 % | 13,00 % | 12,00 % | 13,30 % | |
| Rating | | | | | | | | |
| | | | | | | | | |
| **SNN** | | | | | | | | |
| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | |
| Total Assets (Parent incl loans to CBC) | 54,579 | 62,407 | 69,726 | 74,07 | 81,729 | 86,073 | 95,131 | |
| Total Assets (Parent Bank) | 54,579 | 60,168 | 64,539 | 63,189 | 67,441 | 69,681 | 73,768 | |
| Liabilities and equity | | | | | | | | |
| Market financing (parent + loans to CBC) | | | | | | | | |
| Market financing (parent) | 18,741 | 19,665 | 19,746 | 14,162 | 14,477 | 13,342 | 16,534 | |
| Senior financing ratio in % of parent bank | | | | | | | | |
| Deposits in parent | 27,874 | 32,053 | 34,599 | 34,892 | 39,352 | 41,748 | 41,182 | |
| Deposit ratio % in parent bank | | | | | | | | |
| Assets | | | | | | | | |
| Total lending to customers (group+ loans to CBC) | 45,384 | 48,945 | 49,491 | 46,431 | 46,726 | 48,749 | 51,139 | |
| Total lending to customers (parent) | 15,195 | 17,589 | 18,265 | 17,41 | 17,945 | 19,128 | 21,740 | |
| Commercial lending (parent) | | | | | | | | |
| | | | | | | | | |
| Household lending (Group) | 30,189 | 33,595 | 36,413 | 39,902 | 43,069 | 45,844 | 50,753 | |
| Household lending (parent) | 30,189 | 31,356 | 31,226 | 29,021 | 28,781 | 29,452 | 29,39 | |
| Loans transferred to CBC | 0 | 2,239 | 5,187 | 10,881 | 14,288 | 16,392 | 21,363 | |
| Liquidity portfolio (Parent) - Certificates and bonds at market price | 4,804 | 4,856 | 6,749 | 8,891 | 11,541 | 11,229 | 12,442 | |
| Liquidity portfolio ratio % in parent | | | | | | | | |
| | | | | | | | | |
| **Key numbers to our task** | | | | | | | | |
| % - Encumbered assets (lending in CBC/ Total assets group) | 0,000 | 0,036 | 0,074 | 0,147 | 0,175 | 0,190 | 0,225 | |
| Corp lending/Household lending in parent bank | 0,503 | 0,561 | 0,585 | 0,600 | 0,624 | 0,649 | 0,740 | |
| Commercial lending as % in parent bank (corp lending/total assets parent) | 0,278 | 0,292 | 0,283 | 0,276 | 0,266 | 0,275 | 0,295 | |
| % of total Household lending transferred to CBC | 0,000 | 0,067 | 0,142 | 0,273 | 0,332 | 0,358 | 0,421 | |
| Return on equity (ROE) | 22,9 % | 18,1 % | 8,1 % | 18,2 % | 15,3 % | 8,5 % | 9,0 % | |
| Tier two Capital (TC2) Parent | 10,4 % | 10,0 % | 10,6 % | 14,3 % | 10,9 % | 11,6 % | 12,1 % | |
| Rating | | | | | | | | |
| | | | | | | | | |
| **SpareBank 1 Hedmark** | | | | | | | | |
| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | |
| Total Assets (Parent incl loans to CBC) | 35,665 | 38,009 | 43,664 | 45,733 | 49,183 | 52,702 | 56,278 | |
| Total Assets (Parent Bank) | 35,665 | 38,009 | 41,764 | 41,169 | 41,332 | 42,842 | 43,642 | |
| Liabilities and equity | | | | | | | | |
| Market financing (parent + loans to CBC) | | | | | | | | |
| Market financing (parent) | 8,641 | 8,944 | 9,232 | 7,487 | 7,43 | 7,598 | 8,038 | |
| Senior financing ratio in % of parent bank | | | | | | | | |
| Deposits in parent | 18,987 | 21,024 | 22,484 | 23,187 | 24,208 | 26,042 | 28,168 | |
| Deposit ratio % in parent bank | | | | | | | | |
| Assets | | | | | | | | |
| Total lending to customers (group+ loans to CBC) | 30,22 | 31,405 | 34,664 | 38,798 | 41,793 | 44,646 | 48,091 | |
| Total lending to customers (parent) | 30,22 | 31,405 | 32,764 | 34,232 | 33,942 | 34,786 | 35,455 | |
| Commercial lending (Group incl CBC) | 9,046 | 9,457 | 11,139 | 11,423 | 12,094 | 12,326 | 12,724 | |
| | | | | | | | | |
| Household lending (Group incl CBC) | 20,109 | 21,948 | 23,535 | 25,328 | 27,324 | 29,35 | 31,701 | |
| Household lending (parent) | 20,109 | 21,948 | 21,635 | 20,764 | 19,473 | 19,49 | 19,065 | |
| Loans transferred to CBC | 0 | 0 | 1,9 | 4,564 | 7,851 | 9,86 | 12,636 | |
| Liquidity portfolio (Parent) - Certificates and bonds at market price | 2,941 | 2,665 | 3,009 | 4,18 | 4,531 | 5,234 | 5,104 | |
| Liquidity portfolio ratio % in parent | | | | | | | | |
| | | | | | | | | |
| **Key numbers to our task** | | | | | | | | |
| % - Encumbered assets (lending in CBC/ Total assets group) | 0,000 | 0,000 | 0,044 | 0,100 | 0,160 | 0,187 | 0,225 | |
| Corp lending/Household lending in parent bank | 0,450 | 0,431 | 0,514 | 0,550 | 0,621 | 0,632 | 0,667 | |
| Commercial lending as % in parent bank (corp lending/total assets parent) | 0,254 | 0,249 | 0,266 | 0,277 | 0,293 | 0,288 | 0,292 | |
| % of total Household lending transferred to CBC | 0,040 | 0,152 | 0,324 | 0,524 | 0,587 | 0,657 | 0,690 | |
| Return on equity (ROE) | 13,10 % | 14,20 % | 9,80 % | 8,00 % | 15,30 % | 9,80 % | 9,20 % | |
| Tier two Capital (TC2) Parent | 10,43 % | 13,92 % | 14,10 % | 15,10 % | 14,80 % | 15,20 % | 16,90 % | |
| Rating | | | | | | | | |
| | | | | | | | | |
| **Totals** | | | | | | | | |
| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | |
| Total Assets (Parent incl loans to CBC) | 1403,05 | 1606,32 | 2074,59 | 2080,72 | 2147,36 | 2436,03 | 2617,32 | |
| Total Assets (Parent Bank) | 1364,87 | 1511,02 | 1886,11 | 1843,40 | 1907,68 | 2050,77 | 2198,26 | |
| Liabilities and equity | | | | | | | | |
| Market financing (parent + loans to CBC) | 347,87 | 398,93 | 648,43 | 530,64 | 546,51 | 757,88 | 691,03 | |
| Market financing (parent) | 420,59 | 451,11 | 638,23 | 453,69 | 514,77 | 489,71 | 531,92 | |
| Senior financing ratio in % of parent bank | 0,00 | | | | | | | |
| Deposits in parent | 662,05 | 685,09 | 758,72 | 775,86 | 840,92 | 983,44 | 1070,38 | |
| Deposit ratio % in parent bank | 0,00 | | | | | | | |
| Assets | | | | | | | | |
| Total lending to customers (group+ loans to CBC) | 974,51 | 1138,24 | 1389,06 | 1313,41 | 1389,26 | 1530,84 | 1568,04 | |
| Total lending to customers (parent) | 979,32 | 1052,38 | 1133,50 | 928,27 | 987,00 | 1032,31 | 1046,04 | |
| Commercial lending (parent) | 446,88 | 543,35 | 709,83 | 611,93 | 675,02 | 746,66 | 743,82 | |
| | 0,00 | | | | | | | |
| Household lending (Group) | 587,91 | 656,65 | 720,51 | 772,96 | 828,32 | 894,47 | 971,38 | |
| Household lending (parent) | 533,68 | 514,74 | 427,50 | 316,32 | 302,55 | 290,54 | 304,97 | |
| Loans transferred to CBC | 23,25 | 99,97 | 233,23 | 404,85 | 485,18 | 587,79 | 670,09 | |
| | 0,00 | | | | | | | |
| Liquidity portfolio (Parent) - Certificates and bonds at market price | 156,51 | 105,15 | 152,37 | 351,87 | 377,67 | 305,12 | 310,26 | |
| Liquidity portfolio ratio % in parent | 0,18 | 0,14 | 0,21 | 0,41 | 0,42 | 0,27 | 0,30 | |
| | | | | | | | | |
| **Key numbers to our task** | | | | | | | | |
| % - Encumbered assets (lending in CBC/ Total assets group) | 0,017 | 0,062 | 0,112 | 0,195 | 0,226 | 0,241 | 0,256 | |
| Corp lending/Household lending in parent bank | 0,837 | 1,056 | 1,660 | 1,935 | 2,231 | 2,570 | 2,439 | |
| Commercial lending as % in parent bank (corp lending/total assets parent) | 0,327 | 0,360 | 0,376 | 0,332 | 0,354 | 0,364 | 0,338 | |
| % of total Household lending transferred to CBC | 0,040 | 0,152 | 0,324 | 0,524 | 0,587 | 0,657 | 0,690 | |
| Return on equity (ROE), snitt | 19,8 % | 17,8 % | 9,5 % | 13,0 % | 14,4 % | 10,9 % | 11,0 % | |
| Kapitaldekning, snitt | 10,6 % | 11,0 % | 10,9 % | 13,0 % | 12,4 % | 12,2 % | 13,4 % | |

# 11. References

Allen, F., Bernardo, A. and Welch, I. 2000. *A Theory of Dividends Based on Tax Clienteles*. Journal of Finance.

Annual reports. Annual reports from DNB, Sparebanken Vest, Sparebank-1 SR-Bank, Sparebank-1 SMN, Sparebank-1 SNN and Sparebank-1 Hedemark,.through the years 2006-2012.

Bakke, Bjørn, Ketil Rakkestad. 2010. *Obligasjoner med fortrinnsrett – et marked i sterk vekst.* Norges Bank, Penger og Kreditt 1/2010.

Baltzersen, Morten. 2013. *Det norske obligasjonsmarkedets betydning for den finansielle stabilitet.* Presentation at «OMF-Forum», 16th of January, Oslo.

Bank for International Settlement. 1999. *Principles for the Management of Credit Risk - consultative document.* Retrieved from: http://www.bis.org/publ/bcbs54.htm.

Bank for International Settlements. 2005. *An Explanatory Note on the Basel II IRB Risk Weight Functions.*

Bank for International Settlements. 2010. *A global regulatory framework for more resilient banks and banking systems.* Retrieved from: http://www.bis.org/publ/bcbs189.pdf.

Bank for International Settlements. 2011. *Basel III: A global regulatory framework for more resilient banks and banking systems.*

Bank for International Settlements. 2013. *Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tool.* Retrieved from: http://www.bis.org/publ/bcbs238.pdf.

Bank of International Settlements. 2001. *Operational Risk.* Consultative Document, Retrieved from: http://www.bis.org/publ/bcbsca07.pdf.

Berk, Jonathan and Peter DeMarzo. 2011. *Corporate Finance.* 2th ed. Prentice Hall.

Bernhardsen, Tom, Arne Kloster. 2010. *Liquidity management system: Floor or corridor?* Norges Bank, Staff memo 4/10.

Bjørnestad, Sigurd. 2013. *Mener bankene bør holde tilbake utbytte heller enn å øke renten.* Aftenposten.no. Retrieved from: http://www.aftenposten.no/okonomi/Mener-bankene-bor-holde-tilbake-utbytte-heller-enn-a-oke-renten-7152443.html#.Ub8U2PmGGOg

Brander, Anna Sandvig. 2011. *Mener eurokrisen har blitt en systemkrise.* E24. Retrieved from: http://e24.no/boers-og-finans/mener-eurokrisen-har-blitt-en-systemkrise/20108821.

Christensen, Erik N. 2013. *Fra Basel til Bergen*. Sparebanken Vest.

Demirguc-Kunt, Asli, Harry Huizinga, Ata Can Bertay. 2012. *Bank ownership and credit over the business cycle : is lending by state banks less procyclical.* CEPR Discussion Papers.

Demsetz, Harold, Kenneth Lehn. 1985. *The Structure of Corporate Ownership: Causes and Consequences.* Journal of Political Economy (Volume 93): 1155-1177.

Diamond, Douglas W., Raghuram G. Rajan. 1998. *Liquidity Risk, Liquidity Creation and Financial Fragility: A Theory of Banking.* Federal Reserve Bank of San Francisco (September Issue).

Donaldson, G. 1961. *Corporate Debt Capacity: A Study of Corporate Debt Policy and the Determination of Corporate Debt Capacity.* Boston, Division of Research, Harvard Graduate School of Business Administration.

Eitrheim, Ø., S. Erlandsen. 2011. *House price indices for Norway 1819-2003.* Norges Bank, Occasional Papers no. 35.

European Covered Bond Council. 2012. *European Covered Bond Fact Book 2012.* ECBC Publication, September 2012, 7th Edi.

FDIC (Federal Deposit Insurance Corporation). 2004. *Economic Capital and the Assessment of Capital Adequacy. Retrieved from:* http://www.fdic.gov/regulations/examinations/supervisory/insights/siwin04/economic_capital.html.

Finanstilsynet. 2013. *Tilsyn med finansmarkedet.* Retrieved from http://www.finanstilsynet.no/Documents/Tilsyn_med_finansmarkedet_brosjyre.pdf.

FSA. 2010. *Nye kapital- og likviditetsstandarder for banknæringen,"Basel III".* Finanstilsynet, Pressemelding 42/2010.

FSA. 2012. *FINANSIELT UTSYN 2012.* Retrieved from: http://www.finanstilsynet.no/Global/Venstremeny/Rapport/2012/Finansielt_utsyn_2012.pdf.

FSA. 2012. *Vurdering av regelverket for obligasjoner med fortrinnsrett.* Letter to the Ministry of Finance, 10/3-12. Retrieved from http://www.finanstilsynet.no/Global/Venstremeny/Brev_vedlegg/2012/FIN_Vurdering_av_r egelverket_for_obligasjoner_med_fortrinnsrett.pdf.

GARP – Global Association of Risk Professionals. 2013. *Credit Risk Assessment.* Credit Risk Management (Chapter 1). Retrieved from http://www.garp.org/media/489989/credit%20slides.pdf.

Goodhart, Charles, Boris Hofman, Miguel Segoviano. 2004. *Bank Regulation and Macroeconomic Fluctuations.* Oxford Review of Economic Policy (Volume 20, Issue 4): 591 – 615.

Gram, Trond. 2011. *Når staten tar kontroll.* Norges Bank, Staff Memo No. 18 / 2011.

Greenbaum, Stuart I., Anjan V. Thakor. 1987. *Bank funding modes: Securitization versus Deposits.* Journal of Banking and Finance.

Gripsrud, Geir, and Ulf Henning Olsson & Silkoset. 2010. Metode og dataanalyse. Oslo Høyskoleforlaget.

Hoff, Erna. 2011. *Bankers likviditet og finansiering.* Norges Bank, Penger og kreditt 3/2011.

Hoff, Erna. 2011. *Hvordan er norske bankers finansiering satt sammen, og hvordan virker risikopåslagene på bankenes utlånsrenter?*. Norges Bank. Akutell kommentar 5/2011.

Jensen, Michael C., William H. Meckling. 1976. *Theory of the firm: Managerial behavior, agency costs and ownership structure.* Journal of Financial Economics (Volume 3, Issue 4): 305-360.

Klovland, J.T. 2012. FIE420 NHH.

Kuritzkes, Andrew, Til Schuermann. 2008. *What We Know, Don't Know and Can't Know About Bank Risk: A view from the trenches.* Federal Reserve Bank of New York & Wharton Financial Institutions Center.

Lie, Aud Ebba. 2011. *Finanstilsynets innskuddsundersøkelse under finanskrisen – en kort oppsummering.* Norges Bank, Penger og Kreditt 2/2011.

Longsdon, James, Bridget Gandy. 2012. *Major European Banks' Balance Sheet Encumbrance ... And the Creeping Subordination of Senior Bondholders.* Fitch Special Rapport.

MacroBond. 2013. Sparebanken Vest, 4/25/13.

Martin-Oliver, Alfredo, Jesus Saurina. 2007. *Why do banks securitize assets?*. Finance innovation. Retrieved from: http://www.finance-innovation.org/risk08/files/3433996.pdf.

Megginson, William L. 1997. *Corporate finance theory*. Addison-Wesley.

Meinich, Per, Preben Munthe. 2013. *Bank*. Store norske leksikon. Retrieved from http://snl.no/bank.

Meusel, Steffen. 2012. *Asset-Encumbrance: What will happen to unsecured bank bonds?* Federal Financial Supervisory Authority. Retrieved: http://www.bafin.de/SharedDocs/Veroeffentlichungen/EN/Fachartikel/fa_bj_2012-07_asset-encumbrance_en.html.

Miles, David, Jing Yang, Gilberto Marcheggiano. 2011. *Optimal bank capital.* Bank of England, Discussion paper No. 31.

Miller, Merton H., Franco Modigliani. 1961. *Dividend Policy, Growth, and the Valuation of Shares.* The Journal of Business (Volume 34, Issue 4): 411-433.

Miller, Merton. 1986. *Financial Innovation: The Last Twenty Years and the Next*. Journal of Financial and Quantitative Analysis (Volume 21, Issue 4): 459-471.

Mishkin, F.S., S.G. Eakins. 2009. *Financial markets and institution.* 6th ed. Pearson Prentice Hall.

Modigliani, F., Miller, M. 1963. *Corporate income taxes and the cost of capital: a correction.* American Economic Review (Volume 53, Issue 33): 433–443.

Moody's. 2009. *Moody's downgrades covered bonds issued by Terra Boligkreditt to Aa2.* Moody's Investor service. Retrieved from: http://www.moodys.com/research/Moodys-downgrades-covered-bonds-issued-by-Terra-Boligkreditt-to-Aa2--PR_175551.

Moody's. 2012. *The Probability of default during the years 1920 – 2011.* Moody's Investor Service. Retrieved from: http://www.moodys.com/Pages/GuideToDefaultResearch.aspx.

Myers, Stewart C. 1999. *Financial architecture.* European Financial Management (Volume 5, Issue 2): 133-141.

Myers, Stewart C., Nicholas S. Majulf. 1984. *Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have.* Journal of Financial Economics (Volume 13, Issue 2): 187-221.

Nordea. 2013. *Price/Book Value versus ROE on european banks.* Thomas Svendsen, March 8. 2013, Nordea Markets.

Norges Bank. 2004. *Finansinstitusjonene.* Norges Bank skriftserie nr. 34 Kapittel 5.

Norges Bank. 2004. *Norske finansmarkeder – pengepolitikk og finansiell stabilitet.* Norges Bank, Occasional papers nr. 34.

Norges Bank. 2011. *Penger og Kreditt 1/2011.* Norges Bank (Årg. 39).

Norges Bank. 2012. *Finansiell stabilitet.* Norges Banks, Rapportserie nr. 2.

Norges Bank. 2013. *Pengepolitisk rapport med vurdering av finansiell stabilitet.* Norges Bank, 1/13.

Rajan, Raghuram G. 2005. *Has Financial Development Made the World Riskier?* Federal Reserve Bank of Kansas City (August Issue): 313-369.

Raknerud, Arvid, Bjørn Helge Vatne, Ketil Rakkestad. 2011. *How do banks' funding costs affect interest margins.* Norges Bank, Working paper 2011/9.

Rauh, Joshua. D., and Amir Sufi. 2010. *Capital Structure and Debt Structure.* AFA 2009 San Francisco Meetings Paper; EFA 2008 Athens Meetings Paper.

Schich, Sebastian, Byoung-Hwan Kim. 2012. *Developments in the Value of Implicit Guarantees for Bank Debt: The Role of Resolution Regimes and Practices.* OECD Journal: Financial Market Trends (Volume 2012, Issue 2).

SEB. 2011. *Norwegian covered bond report.* Retrieved from: https://taz.vv.sebank.se/cgi-bin/pts3/mc6/mb/research.nsf/alldocsbyunid/0D0259B9A8A51F5FC12578A8004ED255/$File/2011-Spring-SEB-CB-Report.pdf.

Shleifer, Andrei, Robert W. Vishny. 1986. *Large Shareholders and Corporate Control.* The Journal of Political Economy (Volume 94, Issue 3): 461-488.

Siegelaer, Gaston, Pieter Walhof. 2007. *REGULATORY ARBITRAGE: between the art of exploiting loopholes and the spirit of innovation.* De Actuaris. Retrieved from: http://www.ai-ag.nl/download/819-15-1-PPSiegelaer%26Walhof.pdf.

Sparebanken Vest. 2013. *Moody's metode for rating av banker.* Internal document of Sparebanken Vest.

SSB. 2012. *Økonomiske analyser.* Statistisk Sentralbyrå, 6/2012 31. årgang.

Stephansen, Øystein. 2012. *Obligasjoner med fortrinnsrett; høy kredittkvalitet og god likvidtet.* Presentation 11/21-12.

Stiglitz, Joseph E. 1969. *A Re-Examination of the Modigliani Miller Theorem.* American Economic Review (Volume 59, Issue 5): 784-793.

Syed, Haseeb. 2011. *Markeder for norske bankers langsiktige finansiering – betydningen av endringer i markedsforhold og regelverk.* Norges Bank, Penger og Kreditt 1/2011.

Syvertsen, Bjørne Dyre. 2012. *Sammenligning av nordiske og norske banker basert på ulike soliditetsmål.* Norges Bank, Aktuelle kommentarer Nr. 9 2012.