



## **BASEL IV**

How will a transition to the internal ratings based approach affect Sparebanken Sør's capital allocation, considering new requirements?

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# Preface

This master thesis is the final part of our Master's degree in Financial Economics. It is written at the University of Agder in Kristiansand 2017. Through suggestion from Erik Dahlberg who works as a quantitative analyst for Nordea in Sweden our interest in capital requirements for banks, and subsequently "Basel IV" grew. Through further research on our own, and after meeting with Steinar Vigsnes, Steinar Jørgensen and Marianne Lofthus in Sparebanken Sør, we learned that this is both an interesting and relevant subject for a master thesis in economics.

Writing this thesis has been a very challenging task. Some of the problems we have faced is comprehending this very complicated framework and separating the Basel III framework from Basel IV. It has also been challenging to get an overview regarding what is relevant and what is not. It has been exciting going from not knowing much about this subject, to understanding the complexity and then later understanding and seeing connections in this subject.

We would like to thank Marianne Lofthus, Steinar Vigsnes and Steinar Jørgensen at Sparebanken Sør for giving us this task and helping us when needed. We would also like to thank our supervisor, Roy Mersland, who set us in contact with Sparebanken Sør. Finally, we would like to thank Inge Soteland, auditor at BDO, for interesting discussions and helpful insight regarding "Basel IV" regulations.

# Summary

Banks can either use the Internal rating based (IRB) or the standardized approach for calculating their risk-weighted assets (RWA). However, banks need approval from the national supervisors, in our case Finanstilsynet, to apply the IRB approach.

Finanstilsynet set certain requirements that banks must fulfill in order to get approval for the IRB approach. They need to have well established protocols for calculating parameters in the IRB approach for at least three last years. The application period takes about one year. There are more requirements, but in this thesis, we will focus on these two. The introduction of the IRB models in daily operations will then be in 2020. This means that they will be subject to different capital requirements because of the introduction of, what is called in professional environments, “Basel IV”. When considering the introduction of the IRB approach, we focused on the year 2020.

Sparebanken Sør is interested in the possibility of changing their approach from the standardized approach to the IRB approach. They feel the standardized approach does not accurately reflect their risk exposures when calculating their RWA. If they were to change to IRB methods, their own models would more accurately reflect the risk they accept by issuing a loan or making an investment.

For the purpose of this thesis, we focused solely on credit risk.

The potential benefits that are gained by reducing their RWA is better capital allocation which means that Sparebanken Sør can contribute more liquidity into the economy and therefore, in this case, contribute to growth in the counties Vest-Agder, Aust-Agder and Telemark.

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# 1. Introduction

## 1.1 The role of banks

Banks in society are described by Corrigan (Corrigan, 1982) as different from other financial institutions in three aspects:

- Banks offer transaction accounts
- Banks offer liquidity to other institutions
- Banks are instrument in monetary policy.

Heffernan (Heffernan, 2005) describes the provision of liquidity as the most important activity of banks.

Banks have always played an important role in the financial system in modern societies. Banks provide financial services to people and businesses, and acts as an intermediary. Depositors can safely deposit their savings in the bank and in return, they receive interest on them. Deposits are normally the most important and largest source of funding for banks. These deposits are referred to as demand deposits.

In order to make profits, banks issue loans to their customers. These loans are paid back with interest. Interest is both an income and cost for banks, because banks pay interest on deposits. The borrowers can be both people, businesses and other organizations. The interest received on loans has to be higher than the interest paid on deposits in order to make a profit. This difference is called the interest spread (Investopedia, u.d.). Interest received on loans serves to cover interest payments on deposits, losses, costs associated with controlling interest-rate risk and wages. Banks borrow money with a short-term horizon, and lends out with a long-term horizon. The customer's deposits are converted into loans with longer maturities. This is referred to as maturity transformation (Drechsler, Savov, & Schnabl, 2017). Beside the interest spread, banks also make money through providing financial advices and other financial products to people and businesses.

In a world without banks, people would have to protect their own savings themselves. Borrowers wants access to illiquid loans, and lenders want to access to liquidity. Few savers are willing to tie

up their money for a long period and it would entail a certain amount of risk for the lender, because all their savings would be lost if the borrower was to default. Banks have the ability to absorb a given amount of losses without affecting the savers. In addition, savers and borrowers would have to find each other personally. This would be time consuming and further entailing high search costs. Search costs are one of the biggest transaction cost in finance. With the existence of banks, much of this transaction cost is diminished. By bringing your savings to the bank, they will find a borrower. (Brandl, 2017)

Banks also play an important part in handling the payment system. This is due to people using less cash, leading the bank to process payments and transfers on a daily basis. Høyre has stated that they wish to remove stores duty to accept cash payments by 2020, and has a goal that Norway become a cashless society by 2030 (Astrup, 2017)

## **1.2 The Norwegian banking sector**

All savings banks in Norway are fractional reserve banks. This means that they accept deposits and use these deposits for investments and issuing loans to their customers. Simultaneously, they withhold a fraction of these deposits in cash. These deposits are available for immediate withdrawal by depositors. However, banks do not have enough cash available for all depositors to withdraw their deposits at the same time. (Abel & Bernanke, 2005)

In general, the Norwegian banking sector relies mainly on loans and participate in trading activities in a small degree. This we have observed from analyzing different banks income statements. According to Marianne Lofthus at Sparebanken Sør, the purpose of their market portfolio is access to liquidity.

Banks in Norway are mainly divided into savings and business banks. DNB is the biggest Norwegian bank. It accounts for 28 percent of all private loans. Banks based in other countries occupy the other spots in the top three. Nordea accounts for 11 percent and Danske Bank for 4,5 percent (Finans Norge, 2016a).

## 1.3 The Financial crisis of 2008

In 2008, a global financial crisis struck the world, leading to the most comprehensive recession since the great depression in 1929 (Bhatia, 2011).

One of the main reasons behind this crisis was the collapse of the subprime mortgage backed security (MBS) market in the US. The subprime mortgage crisis was caused by easy access to mortgages for people with bad credit ratings. Loans were given to people with no job, no income and no assets, commonly referred to as “NINJA loans” (Conway, 2008). These loans had an initial low interest rate that the borrowers could maintain, but would later rise. This eventually led to borrowers defaulting, as they were no longer able to maintain their mortgages. Expecting the housing prices to rise even further, people believed that this would function as a security on their mortgages (Case, Shiller, & Thompson, 2012). These loans were sold to other financial institutions and investors in what was called collateralized debt obligations (CDO’s) (Sumerlin & Katzovitz, 2007).

Statistical models of many professional investors and credit rating agencies had overly optimistic forecasts about the CDO’s. The models were based on historically low mortgage default and delinquency rates. Reduction in housing prices was a regional phenomenon and the US had not experienced a nationwide decline in housing prices since World War 2. They therefore assumed low correlation of housing prices across the country, which boosted the valuations of AAA-, rated tranches following perceived diversification following this. (Coval, Jurek, & Stafford, 2009)

Following the increasing defaults of MBS, the housing market in the US eventually collapsed. Overexposure of off balance sheet items like collateralized debt obligations that contained MBS, led to the bankruptcy of one of the leading American investment banks, ”Lehman Brothers Holdings” in September 2008. This bankruptcy, among other collapses in the financial sector, led to a loss of confidence in financial institutions and eventually a global banking crisis. (McDonald & Robinson, 2010). The effects were much more profound than anticipated by many. The financial crisis made it clear how closely connected the financial markets around the world are.

Lehmann Brothers among other financial institutions were what has later been referred to as “too big to fail” (Bentley, 2015). What is meant by this is that they were too important for the government to let them go bankrupt. The effect of such a big financial institution to collapse would

have enormous repercussions throughout the economy. Some of these banks did eventually fail and others needed government aid. This led to the US government giving a 700 billion dollar bailout to different financial institutions to prevent even bigger economic repercussions (US Secretary of the Treasury, 2008).

## 1.4 Banks balance sheet

The bank balance is divided into two parts: the asset section and the owners' equity and liability section. It summarizes the financial balance, how the assets of the banks are financed. The asset section consists mainly of loans to customers, while the equity and liability section mainly consists of loans from institutions, market financing and deposits. The balance of banks differs from the balance of other businesses. Regular balance posts like accounts receivable and accounts payable will not be found in the balance of banks (Kristoffersen, 2010).

Assets	Equity and liability
Cash and deposits in the central bank	Deposits from financial institutions
Loans to financial institutions	Customer deposits
Securities	Debt on securities
Loans to retail market	Subordinated debt
Loans to Sme	Equity

*Table 1 - Banks balance (Hoff, 2011)*

The asset section of the bank balance is divided into liquid and less liquid assets. Loans to customers, which constitutes the biggest part of the bank's assets, and loans to other credit institutions are often considered as less liquid. On the other hand, cash and deposits in the central bank are considered to be liquid. Other assets that include market risk like equities, certificates, obligations and derivatives are also considered to be liquid. (Alger & Alger, 1999)

The deposits from customers usually have no maturity and can be withdrawn at any time and the deposit interests are usually changed in accordance with the interest on loans. The biggest banks get some of both their long term and short-term market financing abroad. The long-term financing

is usually in the form of covered bonds and regular bonds. Covered bonds usually finance mortgages and regular bonds finance corporate loans. During times with financial distress, the regular bonds are the most affected. Norwegian banks use less market funding when compared to foreign banks. Equity constitutes a small part of the balance in the banking sector compared to other industries. This is reflected by their provision of liquidity services. (Hoff, 2011)

A higher growth in housing prices compared to the growth in customer deposits have led to an increase in banks need for market financing. This is illustrated in the following graph for the interval 1995-2011:

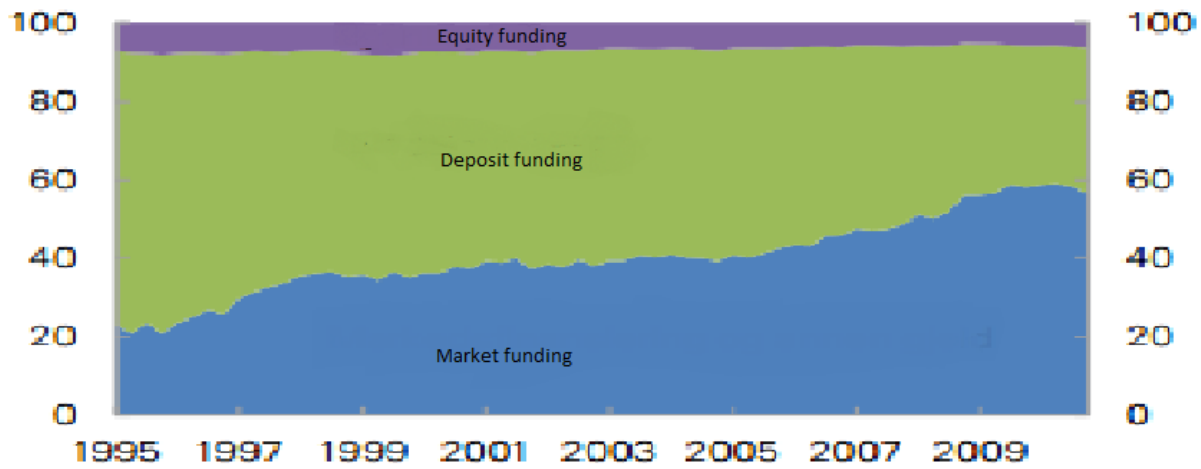


Figure 1 - Banks financing 1995-2011 (Hoff, 2011)

## 1.5 Sparebanken Sør

According to their investor relations page, “Sparebanken Sør is an independent financial institution that engages in banking, securities and real estate brokerage activities in the counties of Aust-Agder, Vest-Agder and Telemark” (Sparebanken Sør, 2017).

They are the sixth biggest bank according to their own presentation of their 4<sup>th</sup> quarter results (Sparebanken Sør, 2016a). Compared to the biggest Norwegian bank, DNB, they are not as diversified geographically. While DNB’s focus is Norway as a whole, Sparebanken Sør’s main

focus is in counties with a total population of 470 000. The biggest companies in these counties are National Oilwell Varco (NOV), oil company, and Agder Energi, energy (www.largestcompanies.no, u.d.). According to their own presentations, they have little exposure to the oil industry, which is currently in decline. (Sparebanken Sør, 2016b)

Competitors are both savings banks in the same areas and national business banks. According to Moody's credit rating, Sparebanken Sør's rating is A1. "Obligations rated A are judged to be upper-medium grade and are subject to low credit risk" (Moody's, 2017). Their total loan portfolio is 90,928 billion NOK and are divided into three categories: mortgages, retail and corporates. Mortgages constitute 60 percent of the total loan portfolio, thus the largest category of the portfolio (Sparebanken Sør, 2016a).

Sparebanken Sør is primarily financed through deposits (48,9 percent) However, market financing accounts for a relatively large of their financing (39,1 percent). This is typical for Norwegian banks (Hoff, 2011).

Sparebanken Sør currently uses a standardized approach in their calculation of their risk-weighted assets (RWA), but are curious as to how new rules and regulations could affect a potential move to the internal ratings based (IRB) approach. They are the only big regional savings bank that currently uses this approach (Sparebanken Sør, 2016b).

Some of the benefits Sparebanken Sør could possibly gain from converting approaches is more efficient capital allocation and better risk management internally.



The asset and equity and liability parts of Sparebanken Sør is best represented by these pie graphs.

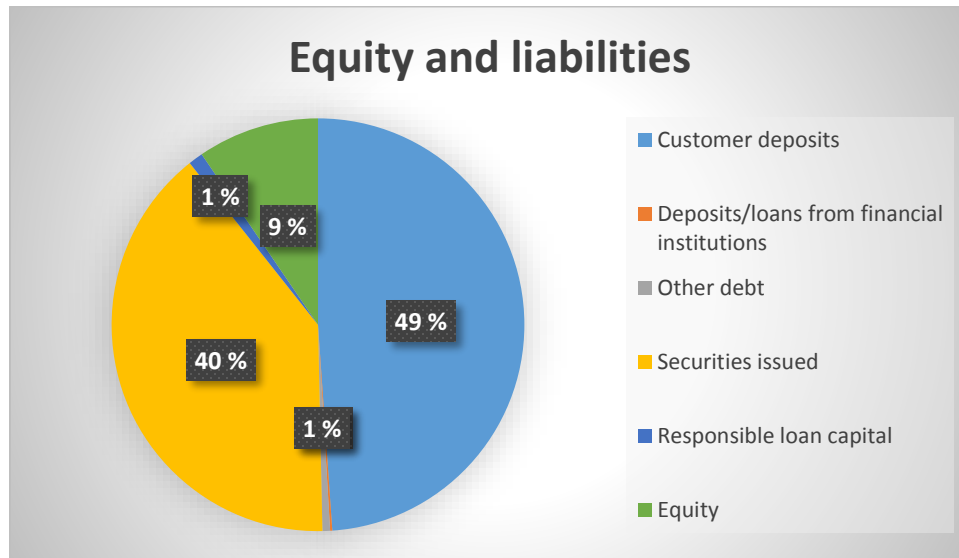


Figure 2 - Sparebanken Sør Equity and Liabilities (Sparebanken Sør, 2016a)

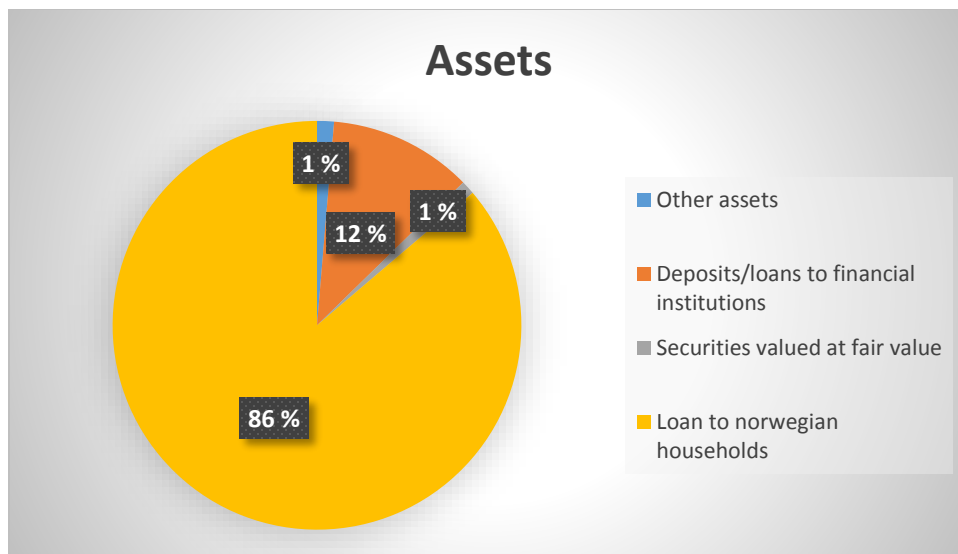


Figure 3 - Sparebanken Sør's Assets (Sparebanken Sør, 2016a)

## **2. Theory**

### **2.1 Motivations for bank regulations**

Prudential regulation of banks has been around since the 1930s due to banks importance in modern societies (White, 2013). After the global financial crisis, prudential regulation of banks has been further emphasized. This is to maintain confidence and stability in financial institutions worldwide and prevent bank runs. Regulations are often justified in the presence of market failures. Some examples of market failures are various externalities, moral hazard and asymmetric information. (Dowd, 1996)

Regulations with respect to the banking sector have yet to reach the level of consensus. Researchers have not decided whether the bank sector should be regulated or not. In the scenario where the banking sector is regulated there is no consensus with respect to the way it should be conducted. (Dowd, 1996)

The motivation behind regulating the banking sector is often discussed in the basis of two arguments: “The systemic risk argument” and “The depositor’s representative argument”, which we will explain in this chapter.

### **2.2 Bank runs**

A bank run occurs when “a large number of customers of a bank or another financial institution withdraw their deposits simultaneously due to concerns about the bank's solvency. As more people withdraw their funds, the probability of default increases, thereby prompting more people to withdraw their deposits. In extreme cases, the bank's reserves may not be sufficient to cover the withdrawals”. (Investopedia)

## **2.3 Protection from bank runs**

One of the proposals for protecting banks from runs is to make “narrow banks”. These banks only invest in riskless securities, such as short-term government issued securities. They would be run-proof, however banks would not be able to provide liquidity services, which is their main function. (Kobayakawa & Nakamura, 2000)

Another proposal is to fully fund banks with equity rather than demand deposits. This would be costly, but would also be run proof. Deposits are better suited than equity contracts in the case of changes to the consumption preferences of consumer. There would be a trade-off between flexibility and stability. (Jacklin, 1987)

Suspension of convertibility is another proposed method of preventing bank runs. Banks would pre-commit to liquidate only the portion of their assets necessary to meet the demand for liquidity of early consumer. This would however only provide full liquidity insurance if the shocks to liquidity are perfectly diversifiable and the numbers of early consumers is known. (Santos, 2000)

The fourth proposal deals with the central banks role as a lender of last resort (LLR). The central bank should at all times make available how much they could lend a bank that is experiencing liquidity problems given that the bank is solvent. This should be done with a penalty to reduce banks incentives to fund normal business with this and the collateral offered should be of good quality. The grounds for which a bank should be issued a loan counteract its necessity to borrow from the central bank. If the bank had collateral of good quality, it should be able to borrow from the market. This method could avoid some of its problems by issuing liquidity to all banks seeking it, but may also lead to moral hazard. (Bagehot, 1873)

The final proposal for preventing bank runs is deposit insurance, which is mentioned more in this chapter of the thesis. (Diamond & Dybvig, 1983)

## **2.4 The Systemic risk argument**

Banks operate with a balance sheet where the liquidation of their assets has a lower value than the liquidation value of the customers’ deposits. This is why banks face the risk of bank runs. The

value of a deposit in case of a bank run is based entirely on the place in line of the depositor. This is because of the existence of a “first come first serve” rule. Bank runs can happen even without the release of adverse information regarding the assets of banks. An example of this would be if depositors were to panic and withdraw all of their funds. This would lead the bank into insolvency. (Diamond & Dybvig, 1983)

In order to make depositors protected from liquidity risk, there has to be no presence of aggregate uncertainty. If also the information about banks short-term investments were made publicly available and if banks are able to lend to each other in the interbank lending market, depositors would be fully insured against liquidity risk (Bhattacharya & Gale, 1987). However, because of asymmetric information banks hold large portions of their assets in illiquid loans. This makes the interbank lending market unavailable to fully grant liquidity insurance. (Flannery, 1996).

Asymmetric information among depositors make banks exposed to another cause of bank runs. A run triggered by certain depositor’s panic, with or without good reasons, can lead to a self- fulfilling bank run. In normal market conditions, the depositors are in a Nash equilibrium where the available liquidity in the banks is sufficient to cover the demand for it. However, if big enough groups of depositors fear insolvency in the bank they will change the Nash equilibrium to a scenario where the bank is no longer able to meet the demand for liquidity and eventually become insolvent. (Calomiris & Gorton, 1991)

Even in cases of symmetric information, certain depositors could for no good reason feel there is a chance of default for the bank and start withdrawals. As the number of withdrawals grows the chance of the bank’s default will rise as well.

Banks main goal in scenarios where depositors may fear for their funds is to assure with the best of their ability that they will in fact continue to provide the liquidity needed for depositors.

## **2.5 The Depositors’ representative argument**

The depositors’ representative argument justifies regulation of banks in the problems that arises when there is a separation of ownership from management and depositors lack of ability to monitor banks. The separation between owners and management also makes corporate governance

challenging to conduct efficiently. This is because the incentives and interests of owners and management are not aligned. It is therefore important that depositors are represented by a private or public agent with respect to monitoring activities. This is to ensure safeguarding for the depositors (Dewatripont & Tirole, 1993).

The activities required to perform monitoring are expensive. Monitoring also requires access to information. Most of the deposits in banks are of small size. The owners of these deposits are mainly referred to as unsophisticated in the sense that they lack knowledge and experience. Individual monitoring of banks therefore lacks incentives to perform. Besides, some banks offer insurance for deposits up to two mill NOK due to their membership in Sikringsfondet (Bankenes Sikringsfond, 2017). This further minimizes depositors' incentive with respect to monitoring activities.

Deposit insurance is a remedy to bank runs, but can also act as a motivator for moral hazard. Moral hazard is defined as: "actions of economic agents in maximizing their own utility to the detriment of others, in situations where they do not bear the full consequences or, equivalently, do not enjoy the full benefit of their actions due to uncertainty and incomplete or restricted contracts which prevent the assignment of full damages (benefits) to the agent responsible" (Kotowitz, 1989).

## **3. Data and method**

### **3.1 Research approach**

When starting on this thesis we felt that the procedure of it became apparent naturally. Our thesis does not have hypothesis or a theory to test, which led us to naturally choose an inductive approach. Saunders, Lewis and Thornhill (Saunders, Lewis, & Thornhill, 2009) says that an inductive approach develops a theory from data that is first being collected.

The other alternative was to choose a deductive approach. These are based on a ready theory, seeing as how “Basel IV” is not implemented we feel an inductive approach became an even clearer choice. Deductive approaches also finds data that either support or reject the theory presented.

Our thesis is conducted through quantitative measures that are backed up by qualitative reasoning.

### **3.2 Literature view**

Literature sources can be primary, secondary or tertiary. Primary data is reports, theses, emails etc. Secondary data is journals, books, newspapers to mention a few. (Saunders, Lewis, & Thornhill, 2009)

When we started out we quickly discovered the massive amounts of data present for relevant subjects. After a while we discovered the search engine of the Bank for International Settlements (BIS) which led us to use the documents found here as our core basis for calculations in our thesis. This has been the basis for our calculations of future capital adequacy. For current calculations we use Kapitalkravsforskriften (Kapitalkravsforskriften, 2017)

Other data was found mainly through Google Scholar, or by searching on Google and then checking the author(s) of relevant documents. The main basis for our theory has been Diamond and Dybvig’s Bank runs, Deposit insurance and Liquidity (Diamond & Dybvig, 1983). We feel this might be one

of the most important pieces of literature regarding the prevention of banks runs seeing how frequently it has been referenced in many of our other sources.

Other important secondary data has been the financial reports posted by Sparebanken Sør. We have gotten data from Sparebanken Sør's fourth quarter report, their yearly income statement was not available when starting and presents the same numbers, and eventually their Pillar 3 report. We have also received some data directly from Sparebanken Sør.

### **3.3 Discussion**

This thesis has been written for Sparebanken Sør. They have helped us both with choosing a research question and also how to approach it. In multiple meetings with relevant personnel, we have discussed different aspects of the new and existing regulations. We have prepared some questions for these meetings, but hesitate in calling these meetings interviews. This because all meetings have turned into interesting discussions, where both parties participated in questioning. We had the same types of discussions with Inge Soteland, Auditor from BDO

### **3.4 Data analysis**

For what we feel is the undoubtedly most important documents for this thesis, the BCBS documents, we had to assume that they are to be implemented like they are proposed at present date.

In order to achieve comparability we had to make some assumptions when analyzing Sparebanken sørs data.

### **3.5 Validity and reliability**

An important aspect of using secondary data is assessing the validity and reliability of the author and the data. Seeing as how most of our literature is based on recognized journals, authors and books we feel the validity of all our data is good.

For a few sources we have used Wikipedia and Investopedia. These are not good sources, but we have mainly used these for definitions and illustrations. We feel this does not affect neither the validity nor the reliability of our thesis.



# 4. Loan portfolio

## 4.1 Mortgages

The market for supplying liquidity for mortgages is characterized by high prices of real estate compared to income. Both for established homeowners and people on the market seeking to invest in their first house. For recent graduates establishing themselves in the housing market this represents a big liquidity problem. Especially when considering the fact that the borrower has to contribute 15 percent with own funds in the financing of the real estate.

This is the reason behind why mortgages are the biggest balance sheet item in most Norwegian banks. This is apparent in Sparebanken Sør's balance sheet where mortgages constitute 60 percent of their total loan portfolio (Sparebanken Sør, 2016a).

If the borrower defaults on their loans and the bank feels they will not be able to get their money back in any other way, they can sue the borrower and demand foreclosure of the real estate. This is a costly and time-consuming process. The bidding process differs from a regular bidding process for the buyer as well. Where in a regular bidding process one feels a sense of urgency and the time frames are short, here bids are tied up for periods of 6 weeks. Another part that differs from a regular bidding process is that the approval of the bids is done by the bank and not the owner of the real estate (Oslo Byfogdembete, 2017). This means that the incentive for maximizing the value of the real estate is gone, and the focus is rather on covering the current value of the outstanding mortgage.

The Norwegian government has recently presented their strategy for the real estate market. This strategy proposed measures with the goal that real estate will be built faster and cheaper. In this strategy, they also introduced mortgage regulations with the intention to ensure a sustainable development of the mortgage market. (Regjeringen, 2016)

In Oslo, which is the biggest real estate market in Norway, they will introduce a higher equity-financing requirement for secondary real estate compared to the rest of Norway. They will increase

it from 15 percent to 40 percent. The intention of this is to reduce the high growth of real estate prices in Oslo compared to other cities. (Regjeringen, 2016)

The government considers allowing banks to grant loans that would not fulfill all regulatory requirements. This number is suggested to be 10 percent of granted loans per quarter, except for Oslo where it is to be limited to 8 percent. This follows their plan of treating Oslo differently from the rest of Norway. (Regjeringen, 2016)

Finanstilsynet suggested removing bank's possibility for flexibility with mortgages. In the hearings, it was pointed out that that this would be too strict and restrict the maneuvering room of banks. “We have followed up a lot of the input from these hearings so that banks would still be able to do discretionary assessments of loan applications to help customers.” according to Siv Jensen.

## **4.2 Corporate loans**

Corporations often need to borrow money to finance investment activities or day-to-day business. Financing is usually done by applying for loans and day-to-day activities are mainly credit lines that are issued by banks. Most corporate loans are usually short term compared to mortgages and are often backed by some sort of collateral. Lines of credit issued is when a bank issues an account that businesses can withdraw cash from up until a certain amount, which they pay interest on. Loans issued to banks in Norway are classified as either small and medium enterprises (SMEs) or big corporations. In the case of Sparebanken Sør, their corporate clients are classified as SMEs.

## 4.3 Retail loans

Retail portfolios cover both corporations and individuals. These are treated differently than other corporate loans and mortgages issued by banks. (BCBS, 2015) Examples of retail loans are:

- Credit cards
- Overdrafts
- Home equity loans
- Other personal loans

Small corporate clients can also be categorized under the retail portfolio.

# **5 Basel Committee for Banking Supervision**

## **5.1 Basel Committee for Banking Supervision**

On the 26<sup>th</sup> of June 1974, the German bank Herstatt was forced into liquidation by regulators. The USD forex market had been very volatile for a period and Herstatt had been trading there and losing. Before being forced into liquidation, they had amassed debts in these markets, which eventually lead to their forced liquidation. A number of banks had released payments of Deutsche Mark to Herstatt in exchange for USD to be delivered in New York. Because of time zone differences and the liquidation, the counterparty banks never received their USD payments. (Becker, 1976) As a response to this, the G-10 countries established what we now refer to as the Basel Committee on Banking Supervision (BCBS).

The goal of the committee is “... to enhance financial stability by improving the quality of banking supervision worldwide, and to serve as a forum for regular cooperation between its member countries on banking supervisory matters” (BCBS, 2016).

Their first goals were to ensure that no banks escaped supervision and that the supervision would be adequate and consistent across jurisdictions. Their first published paper, which is known as the “Concordat”, set out principles for supervisory responsibilities for banks foreign branches, subsidiaries and joint ventures between host and parent supervisory authorities. Certain principles of the “Concordat” were revised, reformulated, and published as the “Minimum standards for the supervision of international banking groups and their cross-border establishments”. National supervisors were invited to endorse these. (BCBS, 1992)

## **5.2 Basel I**

In order to strengthen the soundness and stability in the international banking system, the BCBS published the Basel I accords on July 15 1988. Basel 1 was also supposed to be consistent in its application to banks in different countries. Alongside with the goal of diminishing existing sources

of competitive inequalities for international banks. It consisted of proposals for minimum capital requirements that banks had to retain in liquid assets. These new proposed standards were supposed to ensure that banks were robust. The main focus of the Basel 1 accord was on credit risk and the risk weighting of assets. (BCBS, 1988)

Credit risk is the risk associated with the bank not receiving the full amount on a loan or a receivable. These new regulations meant that capital requirements for banks were calculated considering the risk that follows investments, measured by risk-weighted assets. The risk weights were divided into four different standardized percentage classes, given their credit risk: 0, 20, 50 and 100 percent. (BCBS, 1988)

Below is a table that illustrates the risk weights for different categories under the Basel I accords.

Category	Risk weights
State risk (OECD) and cash	0 %
Government guaranteed corporations	10 %
Banks	20 %
Mortgages with LTV<80%	50 %
Corporations and private sector	100 %

*Table 2 - Risk weights Basel I (BCBS, 1988)*

Further, it contains standards regarding core capital and supplementary. They both had to constitute minimum 4 percent of the banks risk-weighted asset. The total capital requirement is the sum of core capital and supplementary capital. Thus, the minimum total capital requirement had to constitute 8 percent. Core capital is mainly consisting of common stocks, retained earnings and non-cumulative perpetual preferred stocks. Supplementary capital consists of hybrid capital, subordinated debt with maturity that exceeds 5 years and hidden reserves.

$$RWA = EAD \times \text{Risk weight of the exposure}$$

*Equation 1 – Risk-weighted assets*

An example of how to calculate RWA and minimum capital adequacy is presented below and a more detailed explanation follows in subchapter 6.3:

Category	Risk weights	EAD	RWA	Capital req
State risk (OECD) and cash	0 %	1 000 000	-	-
Government guaranteed corporations	10 %	1 000 000	100 000	8 000
Banks	20 %	1 000 000	200 000	16 000
Mortgages with LTV<80%	50 %	1 000 000	500 000	40 000
Corporations and private sector	100 %	1 000 000	1 000 000	80 000
			1 800 000	144 000

Table 3 - Risk weights example Basel I

For the bank in the example core capital and supplementary capital would each have to account for 4 percent of their total RWA, 72 000 for the total of 144 000

Core capital and supplementary capital are referred to as respectively tier 1 and tier 2 capital. Tier 1 capital has the ability to absorb losses without the bank having to cease trading. Tier 2 capital can absorb losses in the event of a winding up, and thus provides less security for depositors and holders of subordinated debt.

The calculation of Capital Adequacy is illustrated below:

$$\frac{(\text{Core capital } 4 \% + \text{supplementary capital } 4 \%)}{\text{Calculation basis}} \geq 8 \%$$

Equation 2 - Capital adequacy Basel I (BCBS, 1988)

The financial system has since the introduction of Basel 1 developed new methods for managing risk and the standardized risk weights from Basel 1 didn't manage to reflect the true risk of the assets (BCBS, 2016) Therefore, banks were able to lower their regulatory capital despite having assets with higher actual risk. Both the implementation and practice of Basel 1 have differed across countries. Banks were able to shift risk that arises from credit exposures to market exposures, which

the Basel 1 framework did not capture. Therefore, it has received some criticism. Borchgrevink (Borchgrevink, 2012) pointed out that Basel 1 has been counteracting to its purpose, which is to be consistent and comparable for financial institutions across countries.

## **5.3 Basel II**

Because the Basel 1 framework proved to be outdated (BCBS, 2016), the Basel committee introduced Basel 2 in June 2004. The main purpose was the same as in the Basel 1 framework, but new and more advanced ways of calculating the capital adequacy was introduced. The intention was to ensure that the capital requirements reflected the risk profile for banks in a more effective way (Karlsen & Øverli, 2001).

Unlike Basel 1, which mainly focused on credit risk, Basel 2 introduced market risk and operational risk in the calculation of capital adequacy. Market risk is defined as the risk of losses in positions due to movements in asset prices (European Banking Authority), while operational risk is defined as the risk of losses due to failing internal processes or external incidents (BCBS, 2011). However, credit risk will be the focus of this thesis.

Basel 2 is divided into three pillars (BCBS, 2004):

- Regulatory capital
- Supervisory review
- Market disclosure.

### **5.3.1 Pillar 1 Regulatory capital**

Basel 2 kept the same minimum requirements for regulatory capital, but included both market and operational risk in its calculation of risk-weighted assets. Basel 2 also introduced new ways of calculating credit risk. The standardized risk weights were derived from Basel 1, but included some important adjustments. One of these was the introduction of the use of credit ratings of corporations, banks/community and countries (BCBS, 2004). This had to be done by authorized

credit rating agencies. The corresponding risk weights were set using these ratings. The risk weights for credit risk are illustrated in the table below:

Credit rating	Countries	Banks/community	Mortgages	Retail	Corporations
AAA/AA-	0 %	20 %	-	-	20 %
A+/A-	20 %	50 %	-	-	50 %
BBB+/BBB-	50 %	100 %	-	-	100 %
BB+/B-	100 %	100 %	-	-	100 %
Below B-	150 %	150 %	-	-	150 %
Unrated	100 %	100 %	35 %	75 %	100 %

Table 4 - Risk weights Basel II (BCBS, 2004)

The new way of calculating the capital adequacy is illustrated below.

$$\frac{\text{Core capital 4 \% + supplementary capital 4 \%}}{\text{Calculation basis}} = \frac{\text{Core capital 4 \% + supplementary capital 4 \%}}{\text{Credit + market + operational risk}} \geq 8 \%$$

Equation 3 - Capital adequacy Basel II (BCBS, 2004)

The difference here between the Basel I formula is the use of market and operational risk in the calculation basis.

The Basel II accords introduced a new way of calculating banks RWA. This was the internal ratings based (IRB) approach. This approach was divided into two subcategories (BCBS, 2001c):

- Foundation IRB (F-IRB)
- Advanced IRB (A-IRB)

Unlike the standardized approach, these methods would use internal models for calculating risk weights instead of using a look-up table for risk weights.

These methods are supposed to reflect risk exposures more exactly when compared to a standardized approach. The theory behind this is that internal models can model for risk that would



not be accurately reflected in the standardized approach. This is because the standardized approach is set at a national or international level.

An in depth explanation of these IRB methods follows in the next chapter.

According to Finanstilsynet, the two most important changes from Basel I were the reductions in risk weights for mortgages and retail exposures (Norges Bank, 2006). Mortgages with high quality security were reduced from 50 to 35 percent. Retail exposures were reduced from 100 to 75 percent. This entailed that exposures of 1 million in each of these categories would reduce their RWA with 150 000 (500 000 - 350 000) for mortgages and 250 000 (1 000 000 - 750 000) for retail exposures. Respectively reducing their capital requirements with a total of 32 000 (12 000 - 20 000).

The introduction of credit ratings for corporations would have the biggest effect for banks with exposures to big corporations with high credit rating. In a case of a AAA rated exposure of 1 million it would reduce RWA by 800 000 and capital requirements by 64 000.

### **5.3.2 Pillar 2 Supervisory review**

This pillar introduced the right for regulatory authorities to assess whether the regulatory capital held by banks accurately reflect the risk they are exposed to. Internal systems and procedures for risk management are controlled, in order to ensure supervisors that they are robust enough. If the supervisors conclude that the regulatory capital retained by banks do not accurately reflect their risk exposures, they have the authority to introduce higher capital requirements for these banks. (BCBS, 2001a)

### **5.3.3 Pillar 3 Market disclosure**

Pillar 3 addresses requirements regarding the reporting of financial information such as risk exposures, capital adequacy and other information that describes important aspects of banks daily operations. The purpose of this is to ensure transparency between banks and the market. Thereby giving investors and creditors better basis for their investments or exposures to these banks. (BCBS,

2001b)Banks post yearly Pillar 3 reports and Sparebanken Sør's report has been much of the basis of our thesis.

### **5.3.4 Basel II transitional floor**

To prevent new calculations from drastically reducing banks RWA and subsequently the regulatory capital, BCBS introduced what has been later named the Basel I floor or the Basel II transitional floor. This floor introduced a minimum value for RWA and was supposed to be a transitional floor. In its introduction in 2007, the floor was set to 95 percent of the Basel I RWA. It was reduced to 90 percent the following year and reduced further to 80 percent in 2009. (Borchgrevink, 2012) The floor was supposed to only last through 2009, but has been continued and still lasts today. BCBS announced in a press release in 2009 to continue this floor without mentioning when or if it was to end. (Borchgrevink, 2012)

## **5.4 Basel III**

Basel III was introduced on December 16 2010. As a response to the financial crisis, Basel III included a clearer focus on systemic risk (BCBS, 2010). This is an important difference from earlier frameworks, which only focused on the individual risk of each bank. Systemic risk is described as the risk associated with the ripple effect following the collapse of a big financial institution. The Basel Committee attempted to improve risk management, regulation and monitoring of the banking sector with Basel III. Further, it was supposed to strengthen the transparency of banks. Even though a bank may look solid, it might be subject to financial trouble when there are macroeconomic imbalances.

The original minimum requirement of 8 percent regulatory capital remained unchanged, but the constituents of capital changed. Basel III puts more of its focus on capital of high quality. During the years under the Basel 2 framework, banks could have a high degree of hybrid capital (tier 2) and at the same time report it as common equity tier 1 capital. This gave the impression that banks were more solid than they actually were. Hybrid capital is in the Basel 3 framework therefore referred to as additional tier 1 capital. In order to be recognized as regulatory capital, hybrid capital

has to be fully loss absorbing. This means that it must be able to be converted into equity without affecting daily operations. From January 2015, Common equity Tier 1 capital and total Tier 1 capital had to constitute respectively 4.5 and 6 percent of the risk-weighted assets.

The new requirements are illustrated below:

$$\text{Common equity adequacy} = \frac{CET1}{RWA} \geq 4,5\%$$

$$\text{Tier 1 capital adequacy} = \frac{CET1 + \text{Additional Tier 1}}{RWA} \geq 6,0\%$$

$$\text{Total Capital adequacy} = \frac{\text{Tier 1} + \text{Tier 2}}{RWA} \geq 8,0\%$$

(BCBS, 2011b)

*Figure 4 - Capital adequacy requirements Basel III*

In order to increase the loss absorbing ability for banks, they added to the existing 8 percent total capital adequacy ratio two new capital buffers. These two new buffers are called “Capital conservation buffer” and “Countercyclical buffer” (BCBS, 2010). The purpose of these being reducing the impact of economic imbalances and the pro cyclicity of banks.

#### **5.4.1 Capital conservation buffer**

The main purpose of the capital conservation buffer is to retain capital in strong economic times that has the ability to be loss absorbing when needed. The capital conservation buffer has to consist of 2.5 percent common equity Tier 1 capital of the bank’s risk-weighted assets at all times. This is in addition to the 4,5 percent requirement, which gives a new total CET1 ratio requirement of 7 percent. If this buffer is reduced, necessary activities to rebuild it will be initiated. Typical activities

for doing this is retaining capital by reducing dividend payments and bonuses to employees. Raising capital through issuing new shares is also an alternative. (BCBS, 2010)

#### **5.4.2 Countercyclical buffer**

The Countercyclical buffer aims to reduce critical losses after periods with high increase of credit and reduce the pro-cyclicality within the bank sector. The amount demanded on the countercyclical buffer will vary in size depending on the current economic situation of the respective country. Therefore, the national supervisors decide upon it. The amount of capital in the countercyclical buffer has to constitute between 0 and 2.5 percent of risk-weighted assets, given the economic situation. The capital it consists of has to be fully loss absorbing. This means that the capital has to be either Common Equity Tier 1 capital or certain types of hybrid capital that can be converted into equity without affecting daily operations. In this way, banks are supposed to function as financial shock absorbers rather than transmitters of risk (BCBS, 2010). High asset prices and increases in credit are the most important indicators to decide how the current economic situation is. National Supervisors will therefore analyze these indicators in order to decide when the countercyclical buffer needs to be applied. All banks that operate within a certain jurisdiction must follow up on the demands put forth by the supervisors regarding this buffer. As with the capital conservation buffer, activities with the purpose of rebuilding this buffer will be initiated, if found necessary by the national supervisors. (BCBS, 2010)

#### **5.4.3 Systemic risk buffer**

The Council of the European Union introduced a buffer called the Systemic Risk Buffer. This is because systemic risk is not taken into account by the other buffers. The intention was to reduce and prevent long term and non-cyclical systemic risk. This buffer has to consist of CET1 capital. The amount of CET1 capital has to constitute 3 percent of the risk-weighted assets.

#### 5.4.4 The Systemically Important Financial Institutions (SIFI) buffer

Banks that Finanstilsynet considers systemically important are subject to the SIFI Buffer. Sparebanken Sør is on the list of systemically important financial institution and is therefore obliged to the requirements put forth regarding this buffer. This buffer also has to consist of CET1 capital. The amount of CET1 capital on this buffer has to constitute 2 percent of the risk-weighted assets at all times. This percentage is decided upon by Finanstilsynet and applies to all Norwegian systemically important banks regardless of size. (EUROPEAN PARLIAMENT AND OF THE COUNCIL, 2013)

#### 5.4.5 Common Equity Tier 1 requirements

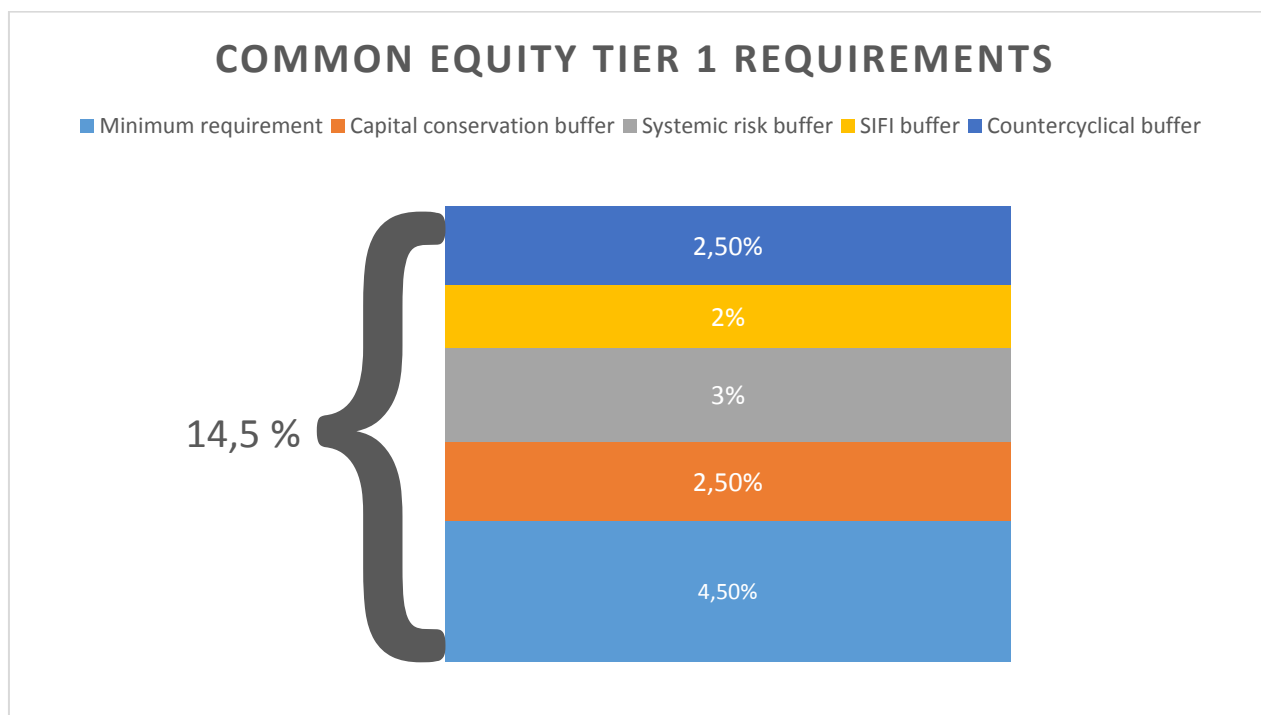


Figure 5 - CET 1 ratio

#### 5.4.5 Leverage ratio

A series of international studies shows that the leverage ratio is a better indicator of a bank's solidity through a crisis than risk weighted capital adequacy. Since the introduction of Basel II, the assets of banks have risen without a corresponding increase in risk-weighted assets. BCBS suggested in

2011 to introduce the leverage ratio as a supplementary capital target for capital adequacy based on the RWA. In the proposition, it was put forth a minimum requirement of 3 percent. EU then introduced requirements in CRD IV of calculating the leverage ratio and showed an ambition to introduce a minimum requirement to this leverage ratio. (BCBS, 2014a)

The leverage ratio is non risk based and is supposed to as act an additional measure to risk based capital requirements. It is intended to:

- Hinder the buildup of excessive leverage in the banking sector and avoid situations like the financial crisis, where excessive leverage in the banking sector destabilized the financial sector.
- Strengthen the risk-based requirements with a non-risk based “backstop” measure that is simple to calculate

(BCBS, 2014a)

It will reduce the incentives of banks to use low RWAs to increase their financial leverage, mitigate large unexpected losses in low-RWA portfolios and address a lack of market confidence in RWAs.

$$\text{Leverage ratio} = \frac{\text{Capital measure}}{\text{Exposure measure}}$$

*Equation 4 - Leverage ratio (BCBS, 2014a)*

The capital measure here is “the tier 1 capital risk-based capital framework as defined in paragraphs 49 to 96 of the Basel III framework taking account of transitional framework” (BCBS, 2014a). This is represented as the previously mentioned Tier 1 capital used for the calculation in CET1.

The exposure measure is the sum of the following exposures:

- On-balance sheet exposures
- Derivative exposures
- Securities financing transaction exposures
- Off balance sheet items

This table represents the leverage ratio of certain banks in the European banking sector.

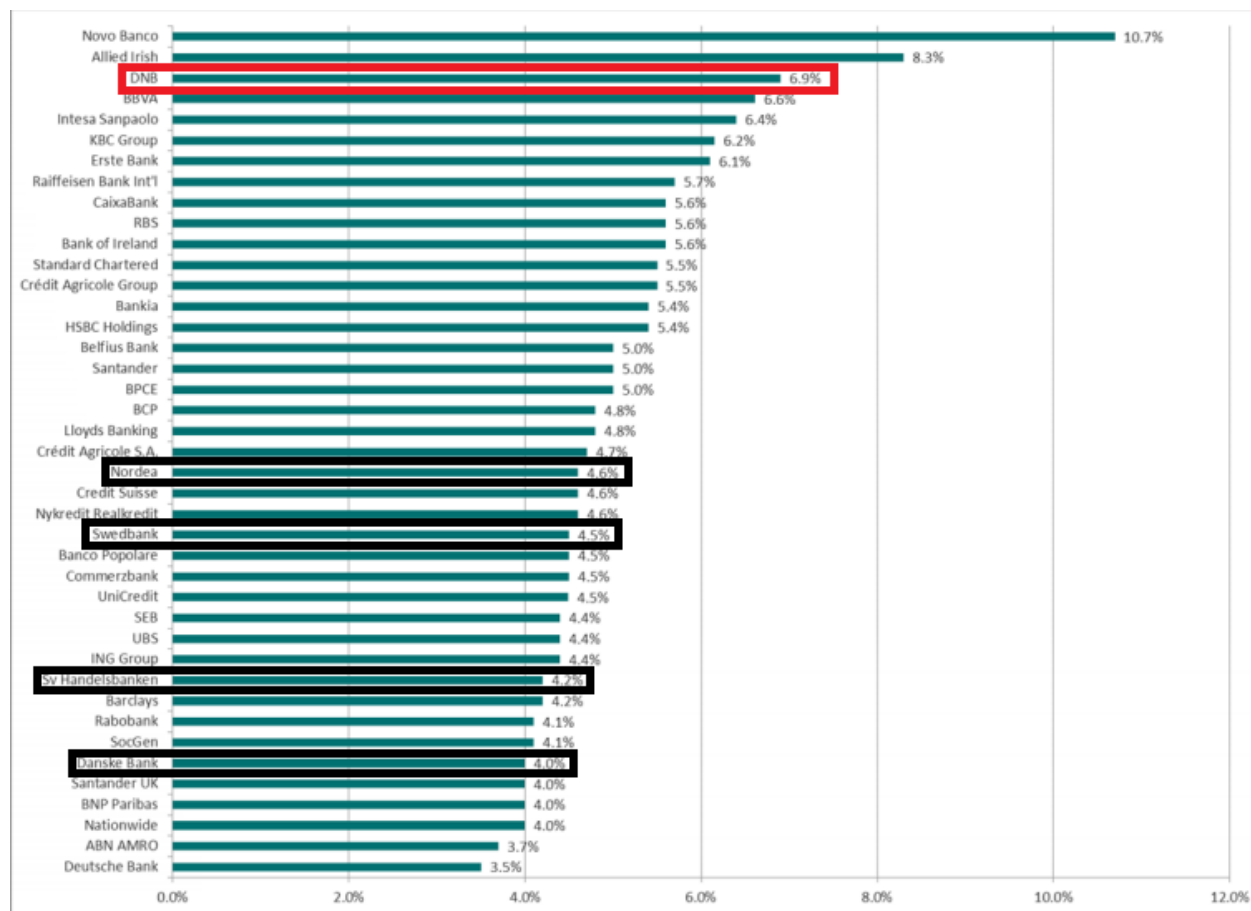


Figure 6 - Leverage ratio European banks (Sparebanken Sør, 2016b)

DNB, Norway's biggest bank, has a comparatively high leverage ratio compared to other large banks in Europe. Sparebanken Sør has an even higher leverage ratio of 8,61 percent. Banks that are based in other Scandinavian countries, but still competes directly with Sparebanken Sør, is marked in black These banks have a leverage ratio of 4,6 percent and lower. This makes the Norwegian banks on the higher end of the European banks in regards to leverage ratio.

Finanstilsynet has introduced a minimum requirement for all Norwegian financial institutions from 30 June 2017. This entails Sparebanken Sør's and all banks in Norway's minimum leverage ratio requirement will be 6 percent from June 30, 2017. (Sparebanken Sør, 2016c)

According to Finanstilsynet's analysis in 2018, following completed EU regulations, they will introduce a minimum requirement of 3 percent for all financial institutions. Additional buffers will

be introduced with an additional buffer of 3 percent for banks. England and Denmark consider using 3 percent while Sweden consider 5 percent. (Robberstad, 2016)



# 6. Standardized approach and IRB approach

## 6.1 IRB approach

The internal ratings-based (IRB) approach uses internal models and estimates for calculating the risk weights for exposure classes of their portfolios. An IRB model has to include modeled variables such as the probability of default (PD), loss given default (LGD), exposure at default (EAD) and other parameters. (BCBS, 2001c)

Losses calculated in the IRB approach can be divided into three categories

- Expected loss
- Unexpected loss
- Stress loss

Expected loss is the normal cost of doing business covered by provisioning and pricing policies.

Unexpected loss is potential unexpected loss for which capital should be held.

Stress loss is unexpected loss for which it is found too expensive to hold capital to prevent. Losses of this magnitude will lead to insolvency.

The goal of a good IRB model is to define the cutoff point between these three types of losses. A graphic example is presented below:

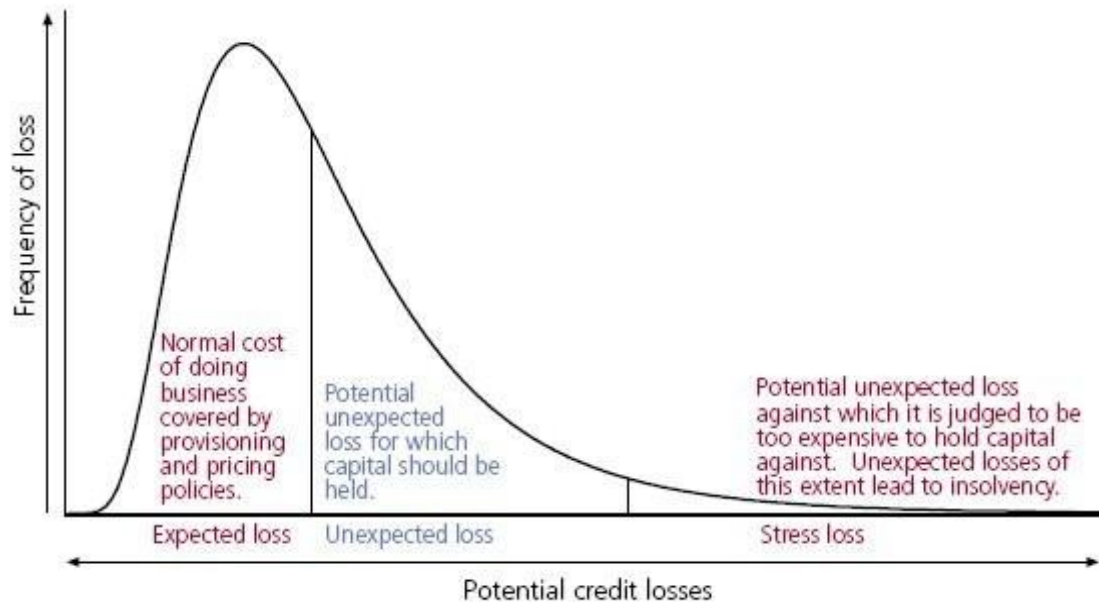


Figure 7 - IRB model (Wikipedia)

The IRB model consists of two different approaches; advanced (A-IRB) and foundation IRB (F-IRB). (BCBS, 2001c)

§3-1 of the capital requirement regulation (CCR) for Norway deals with the approval process of IRB approaches. It says that Finanstilsynet has to give banks approval to use this approach. Further, it has to approve the models that banks want to use to calculate the risk parameters they intend to use in the IRB approaches. According to Marianne Lofthus, the motivation for banks applying for the IRB approach is to release more capital for lending to the community and contributing to growth. (Kapitalkravsforakriften, 2017)

There is only one way to treat mortgage exposures regardless of the method used on other exposures. The CCR does not distinguish between A-IRB and F-IRB for exposures to retail either. (Kapitalkravsforakriften, 2017)

### 6.1.1 F-IRB

Under the F-IRB approach the bank's own PD estimates have to fulfill §12-4 of the Norwegian CRR law. Some of the conditions here are that the banks number of risk classes should sufficiently reflect the differences in default risk and sound quantification of risk and validation.

CRR requires that banks have at least seven risk classes for non-defaulted counterparties and one for defaulted counterparties. (Kapitalkravsforskriften §12-4)

The quantification of PD must fulfill these demands:

- PD has to be estimated from yearly default frequencies
- A minimum PD of 0,03 percent for all exposures except loans to countries
- For defaulted exposures PD is equal to 1

An interesting point to note is that the definition of defaulted exposures is when a payment is delayed more than 90 days (Kapitalkravsforskriften §10-1) and is the weighted with a PD of one. This is also the case when the company in reality is able to pay. As an example, an exposure of 1 million NOK would be weighted with a higher risk weight, following this higher PD, even if this exposure was to a corporation like Statoil, a company that could easily cover this exposure.

The bank's dataset for estimating these exposures would have to cover at least a 5 year period, with some exceptions that is we feel not relevant in our thesis. For exposures to highly leveraged companies, whose assets mainly belong to a trading portfolio, the PD estimation should reflect a high stress period. (Kapitalkravsforskriften §12-4)

For corporation S is the highest of five or total consolidated revenue for the counterparty and companies in the same group. This is if the value of the assets in this company or group is a more relevant measurement for size. Then the value of assets is to be used in the calculation. (Kapitalkravsforskriften §12-8)

For exposures where the PD value is not equal to one, the formula is a follows:

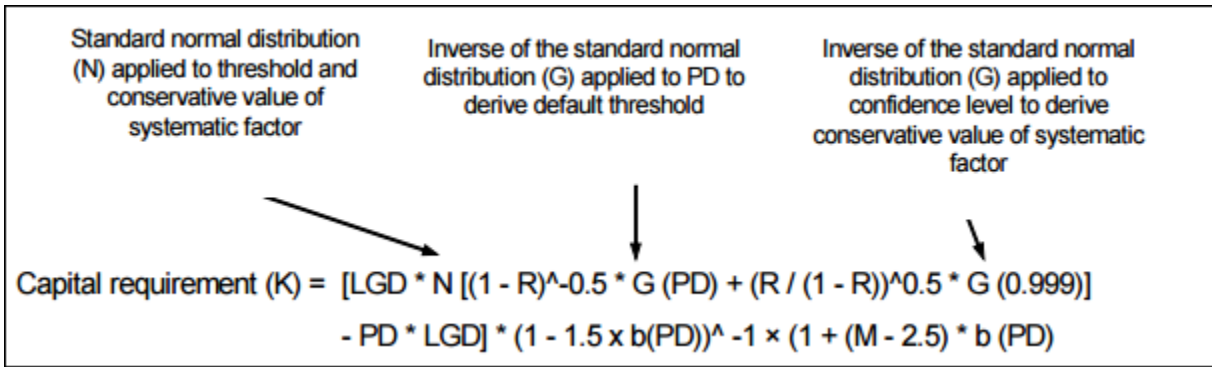


Figure 8 - IRB Formula (BCBS, 2005)

*N* is the cumulative standard normal distribution function

*G* is the inverse of *N*

$$b = (0,11852 - 0,05478 \times \ln(\text{PD}))^2$$

*ln* is the natural logarithmic function

Equation 5 - IRB Formula (Kapitalkravsforordningen §15-1, 2017)

*R* is calculated in two different ways. For states, institutions and corporations, equity positions under the PD-LGD method and for the risk of impairment of purchased receivables, it is calculated like this:

$$R = 0,12 + 0,12 \times \frac{e^{(-50 \times \text{PD})} - e^{-50}}{(1 - e^{-50})} - \frac{50 - S}{1125}$$

Equation 6 - *R* for states institutions and corporations (Kapitalkravsforordningen §15-1, 2017)

For exposures with retail exposures to credit risk it is set to 0,15 for real estate exposures and 0,04 for special drawing rights. For other retail exposures it is:

$$R = 0,03 + 0,13 \times e^{(-35 \times \text{PD})} - \frac{e^{-35}}{1 - e^{-35}}$$

Equation 7 - *R* for other retail exposures (Kapitalkravsforordningen §15-1, 2017)

For exposures that do not fit into any of the categories it should assign the value for R which gives the highest value.

### **6.1.2 A-IRB**

The advanced IRB approach uses quantitative internal models for their PD, EAD and LGD among other parameters used in calculating RWA. It has, as the F-IRB approach, to base its estimates on at least 5 years of data. (BCBS, 2001c) (Kapitalkravsforordningen, 2017)

Getting approval for an A-IRB approach is more difficult than for the F-IRB approach. Our contacts at Sparebanken Sør speculates that the A-IRB approach is the ultimate goal for all banks that apply for the IRB approval.

Banks that use this approach use their own estimates for LGD and EL, which the F-IRB does not. It therefore has more complicated models that has to be calculated for both approval and to be used in the calculations of RWA. (BCBS, 2001c)

## **6.2 Standardized approach**

The standardized approach differs from IRB because it does not require the use of internal models in estimation of any values except EAD (BCBS, 2001c). The EAD value is then multiplied by the risk weight for every exposure.

The international standards are mostly based on the use of external ratings (BCBS, 2004), but this is not as common in Norway when compared to other bigger countries in Europe. Acquiring a rating from a certified rating agency is both a time consuming and costly process. According to Standards and Poor's US ratings fee disclosure the minimum fee for a rating with their agency for a corporation is 135 000 \$ or about 1,2 million NOK (S&P, 2017). This is a cost that would be hard to justify for many Norwegian companies.

## 6.3 Calculating the risk-weighted assets for credit risk

As an example for calculating the risk-weighted assets we will for this purpose use DNB's income statements for the 4th quarter since these are what we have available while writing this.

	Specification of risk-weighted volume and capital requirements			DNB Group		
	Nominal exposure	EAD <sup>1)</sup>	Average risk weights in per cent	Risk-weighted volume	Capital requirement	Capital requirement
	31 Dec. 2016	31 Dec. 2016	31 Dec. 2016	31 Dec. 2016	31 Dec. 2016	31 Dec. 2015
<i>Amounts in NOK million</i>						
<b>IRB approach</b>						
Corporate	1 039 384	842 921	48.4	407 740	32 619	33 421
Specialised lending (SL)	8 825	8 517	52.3	4 456	356	468
Retail - mortgages	706 195	706 195	22.1	155 814	12 465	12 241
Retail - other exposures	112 484	92 484	25.7	23 759	1 901	1 965
Securitisation	12 760	12 760	91.8	11 718	937	1 201
<b>Total credit risk, IRB approach</b>	<b>1 879 648</b>	<b>1 662 878</b>	<b>36.3</b>	<b>603 487</b>	<b>48 279</b>	<b>49 295</b>
<b>Standardised approach</b>						
Central government	55 426	69 760	0.1	84	7	33
Institutions	147 549	99 864	24.9	24 858	1 989	2 230
Corporate	160 608	127 538	85.9	109 582	8 767	9 657
Retail - mortgages	51 665	49 631	45.5	22 559	1 805	1 764
Retail - other exposures	122 926	48 737	75.4	36 742	2 939	2 642
Equity positions	19 225	19 224	233.1	44 804	3 584	276
Securitisation	1 760	1 160	44.6	518	41	60
Other assets	15 210	15 210	69.7	10 594	848	535
<b>Total credit risk, standardised approach</b>	<b>574 370</b>	<b>431 124</b>	<b>57.9</b>	<b>249 741</b>	<b>19 979</b>	<b>17 195</b>
<b>Total credit risk</b>	<b>2 454 018</b>	<b>2 094 002</b>	<b>40.7</b>	<b>853 228</b>	<b>68 258</b>	<b>66 490</b>

Table 5 - DNB's calculation of capital adequacy (DNB, 2016b)

As is apparent in DNB's financial figures the first step in such a calculation is calculating the exposure at default (EAD). The EAD is a measure of how much money a bank's, in this case, expected loss is should the borrower default on their loan. It is calculated using the current loan and multiplying unused credit lines by a credit conversion factor (CCF). This is calculated for each individual loan.

The risk weights for the different categories of loans are also calculated on a case-by-case basis in the IRB approach. The framework applied for this example is the Basel III framework. Since they are awaiting final approval from Finanstilsynet on their IRB approach for a part of their company (DNB, 2016a) they also have to apply the standardized approach.

For the purpose of this thesis we have chosen to disregard both operational and market risk. The credit risk is by far the biggest part of Norwegian savings banks total RWA. The complexity for the calculations of the other risk categories compared to the small percentage of total RWA it represents makes it too complicated and time consuming. This would also require a lot of information from Sparebanken Sør which would lead to this thesis being confidential. In the beginning we tried to avoid this, but found no way around the issue of confidentiality towards the end.

We feel that the credit risk, in regards to corporate and mortgages will give a good representation about what we aim to achieve in this thesis.

## **7. “Basel IV” Standardized approach**

For the Basel IV part of this thesis we are going to be focusing mainly on consultative papers published by BCBS.

### **7.1 Revisions to the SA for credit risk (BCBS 347)**

This will be based on the second consultative document published by the BCBS in December 2015 (BCBS, 2015). For the purpose of our thesis, we will look at these proposals as final, and in large part disregard national discretions.

The planned introduction of these changes are in 2019 (BCBS, 2015) as with most changes the committee are proposing now. The exception is for the Fundamental Review of the Trading Book (FTRB), which will have a transitional introduction from 2019-2022. The FTRB is mainly focused on market risk, but also accounts for credit risk, considering how they will remove the option to move exposures from the trading book to the banking book. (BCBS, 2013)

### **7.2 Exposures to banks (BCBS, 2015-4)**

In their first consultative document the committee planned to remove the dependence on external ratings in its entirety (BCBS, 2014c). We believe that this is because of the financial crisis and the ratings agencies that gave bad ratings at that time. This approach was found to not be sufficiently risk sensitive and too complex (BCBS, 2015). However, in their second consultative document they reintroduced the external ratings. According to this document they are supposed to be conducted in a less mechanistic manner than previously (BCBS, 2015).

Exposures to banks will be based on a hierarchical approach. There are two different scenarios a bank can find themselves in according to this. In the first scenario banks either have an external rating and are allowed to use these for calculating risk. In the other scenario they either don't have a rating or are in a country where the use of external ratings is prohibited. (BCBS, 2015) The latter is often the case in Norway as few banks have a ratings, according to Inge Sotland.



Where an external rating is available and allowed to apply the lending bank can from a simple lookup table easily find the Base Risk Weight (BRW) for the borrowing bank. After a due diligence requirement they will decide if they should add RW to the calculation.

External rating of counterparty	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-
"Base" risk weight	20%	50%	50%	100%	150%
Risk weight for short-term exposures	20%	20%	20%	50%	150%

Table 6 - Exposures to banks where ratings are available (BCBS, 2015)

The total risk weight of the exposure would then be:

$$\text{Base RW} + \text{Due diligence} = \text{Risk weight of exposure}$$

Equation 8 - Risk weight banks

Where the use of ratings is prohibited, or not available, the exposure will be given one of three grades. A, B or C.

Credit risk assessment of counterparty	Grade A	Grade B	Grade C
"Base" risk weight	50%	100%	150%
Risk weight for short-term exposures	20%	50%	150%

Table 7 - Exposures to banks where rating are not available (BCBS, 2015)

Most Norwegian banks are unrated because this is both a time consuming and costly process. According to Inge Soteland, Accountant at BDO, there will be no Norwegian banks below bucket A. He also said that he believes that this will benefit rated banks because they can borrow money at a lower rate than their unrated counterparties that are not rated. This because there would be a lower RW associated with lending to banks like DNB and Sparebanken Sør.

Sparebanken Sør's rating is A1 (Sparebanken Sør, 2016c) according to Moody's rating, which translates to an A+ rating. This corresponds to a risk weight of 50 percent if they were to receive a loan from another bank.

### 7.3 Exposures to corporates (BCBS, 2015-6)

Exposures to corporates will have the same basis as exposures to banks with the base RW + Due diligence, but with a different look up table and RWs.

External rating of counterparty	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to BB-	Below BB-	Unrated
"Base" risk weight	20%	50%	100%	100%	150%	100%

*Table 8 - Exposures to corporates (BCBS, 2015)*

Where ratings are available and allowed the BRW will be what is found in the look up table. Where they are not available, very often the case in Norway, or their use is not allowed they will use the 100 percent RW if they are not in default.

For corporate Small and Medium Enterprises (SME) they plan to introduce a flat 85 percent RW. The committee has based this on two aspects:

- SMEs usually provide more physical collateral than other large corporates. This collateral is not being recognized under the current standardized approach credit mitigation framework. This collateral may offer protection against credit losses by reducing loss given default compared to other large corporate exposures.
- The IRB approach includes a firm size adjustment for SMEs, which reflect a lower correlation between size of a corporation and their asset value. This leads to a lower RW for such exposures

Most businesses would fall under this definition in Norway and this would have great effect here. The paper does not mention anything about national supervisor's ability to change the rules about

this under their supervision. If it can be decided by national supervisors the final ruling will be made by Finanstilsynet.

SMEs are defined “corporate exposures where the reported sales for the consolidated group of which the firm is a part is less than €50 million”. Originally this definition is from the Basel II regulations, and is the proposed definition for the “Basel IV” regulations.

In jurisdictions where the use of external ratings are not allowed banks can assign a 75 percent risk weight to corporate exposures which meet the definition of “investment grade”. “Meaning they have adequate capacity to meet their financial commitments (including repayments of principal and interest) in a timely manner, irrespective of the economic cycle and business conditions.” (BCBS, 2015)

## **7.4 Retail portfolio (BCBS, 2015-8)**

In the current standardized approach for retail exposures, the exposures are defined based on four different criteria and no differentiating between different kinds of retail exposures. In their 2014 document, the BCBS suggested introducing two different kinds of retail exposures. Regulatory retail and other retail. However, they were at the time lacking definitions for these exposures. The BCBS’ decision is to define retail exposures as exposures to retail SME’s and individuals.

The committee sought respondents’ views on 4 different risk driver:

- The extent to which an exposure is secured by a durable good
- The percentage of the borrower income available to service the loan
- The maturity of the exposure
- Whether there is already an established relationship between the borrower and the bank

The BCBS conducted a quantitative impact study (QIS) to investigate which risk drivers had the potential to increase risk sensitivity. Their conclusion was that only to which extent an exposure was secured by durable goods would increase risk sensitivity. The committee concluded this would lead to unnecessary complexity of these calculations.

They then decided to introduce a flat 75 percent risk weight for all exposures in the retail exposure class.

(BCBS, 2015)

## **7.5 Residential real estate exposures (BCBS, 2015-9.1)**

Real estate exposures are currently the only exposures where collateral is the security of the exposures instead of the counterparties. The current risk weight for residential exposures are 35 percent if they fulfill certain prudential criteria, such as a substantial margin of additional security over the loan.

Under the new approach, exposures secured by real estate would receive differing risk weights depending on whether repayment of the loan is materially dependent on cash flows generated by the real estate.

In their document published in 2014 the BCBS suggested to introduce the LTV ratio and debt servicing charge (DSC) as risk drivers for the borrower's ability to meet their obligations. Risk weights would then be assigned by following these risk drivers from a look up table ranging from 25 to 100 percent.

The feedback from respondents supported the use of the LTV ratio. However, concerns were raised about the use of DSC as a risk driver. Respondents were concerned about a standardized definition and a fixed threshold for the DSC, given the differences in underwriting practices, tax regimes, average income and tax regimes across jurisdictions.

Following the BCBS' QIS study decided to retain the LTV ratio as a main risk driver with conditions that the value of the real estate be set prudently and kept constant at origination. With national supervisors being able to interfere and adjust the value downwards in case of a general decline in market prices.

Defining a DSC ratio that will be equal across jurisdictions would be challenging, so they choose to disregard this way of calculating repayment possibilities. They do however require banks to assess the borrower's ability to pay through a predictor such as the DSC.

To apply preferential risk weights, banks would have to assess the borrower’s ability to repay based on the quality of the collateral. These requirements would focus on:

- Adequate valuation
- Finished property
- Seniority of lien
- Legal enforceability
- Required documentation

If these requirements are not all fulfilled, irrespective of the LTV ratio, banks would have to assign a higher risk weight.

The proposed risk weights are as follows

If repayment is not materially dependent on cash flows from the real estate:

	LTV ≤ 40%	40% < LTV ≤ 60%	60% < LTV ≤ 80%	80% < LTV ≤ 90%	90% < LTV ≤ 100%	LTV > 100%
Risk weight	25%	30%	35%	45%	55%	RW <sub>counterparty</sub>

*Table 9 - Mortgage risk weights when not dependent on cash flows (BCBS, 2015)*

If repayment is materially dependent on cash flows from the real estate:

	LTV ≤ 60%	60% < LTV ≤ 80%	LTV > 80%
Risk weight	70%	90%	120%

*Table 10 - Mortgage risk weights when dependent on cash flows (BCBS, 2015)*

An interesting proposed change in regulation would be to disallow the use of increasing the value in the denominator according to increase in price for real estate that is normal practice today. An example calculating this effect is presented later in this thesis.

## 7.6 Harmonization and capital output floors (BCBS, 2014b)

The BCBS has announced an introduction of a new capital output floor. This floor will be based on the standardized approach. Their goal is to reduce variation in capital ratios across different banks. With this floor, they feel they will increase the reliability and comparability of banks' risk weighted capital ratios (BCBS, 2014b). It will replace the current transitional floor, which is based on the Basel I standard.

The suggested formula for this floor is:

$$\text{Max}(\text{Capital requirements: IRB approach}; \text{Capital requirements: Floor factor} \times \text{SA})$$

*Equation 9 - Capital output floor (BCBS, 2014b)*

The committee has still not decided on the granularity of the floor. They are discussing to either base it on the total capital requirements or differentiate between different types of risk, i.e. credit, operational and market risk. For the purpose of our thesis we will use the granularity approach, and calculate the floor factor for credit risk. The floor factor is expected to constitute between 60-90 percent of the standardized approach. (BCBS, 2016)

This will, in the committee's view, even the playing field and make all actors dependent on the calculations of the standardized approach. It will oblige banks currently using the IRB approach to calculate their RWA using the standardized approach as well. (BCBS, 2016)

## 7.7 Additional changes relevant for Sparebanken Sør

These changes will not be essential in our calculations, but are relevant for Sparebanken Sør when considering changing approaches from standardized to IRB. Therefore we feel they have to be addressed. The changes here are mainly taxonomy changes.

### 7.7.1 Commercial real estate exposures (BCBS, 2015-9.2)

Most exposures in this class secured by real estate are weighted 100 percent. This class is viewed as a recurring source of troubled assets by the banking sector.

The committee propositioned two ways of treating these exposures

- Applying the risk weight of the counterparty, allowing for national discretion to reduce the risk weight under certain criteria
- Assigning a risk weight according to a look-up table based on the LTV ratio

BCBS revised proposal suggests these exposures to be dependent on the same requirements as mentioned in 7.5 Residential real estate exposures. Similarly assigning a more conservative risk weight if these requirements are not met. Namely the higher of 100 percent and the risk weight of the counterparty. The new risk weights will be based on two look up tables. Repayment being depending and not depending on cash flows generated from the real estate.

If repayment is not materially dependent on cash flows from the real estate:

	LTV ≤ 60%	LTV > 60%
Risk weight	Min (60%, RW of Counterparty)	RW of Counterparty

*Table 11 - Commercial real estate exposures when not dependent on cash flow (BCBS, 2015)*

If repayment is materially dependent on the cash flows:

	LTV ≤ 60%	60% < LTV ≤ 80%	LTV > 80%
Risk weight	80%	100%	130%

*Table 12 - Commercial real estate exposure when dependent on cash flows (BCBS, 2015)*

(BCBS, 2015)

## 7.7.2 Specialized lending exposures to corporates

“A corporate exposure will be treated as a specialized lending exposure if such lending possesses all the following characteristics, either in legal form or economic substance:

The exposure is not related to real estate and is within the definitions of object finance, project finance or commodities finance under paragraph [39] below. If the activity is related to real estate, the treatment would be determined in accordance with paragraphs [49 to 61];

- The exposure is typically to an entity (often a special purpose entity (SPE)) that was created specifically to finance and/or operate physical assets;
- The borrowing entity has few or no other material assets or activities, and therefore little or no independent capacity to repay the obligation, apart from the income that it receives from the asset(s) being financed;
- The terms of the obligation give the lender a substantial degree of control over the asset(s) and the income that it generates; and
- As a result of the preceding factors, the primary source of repayment of the obligation is the income generated by the asset(s), rather than the independent capacity of a broader commercial enterprise.”

(BCBS, 2015)

From the first to the second consultative document, they changed their plans. Originally, they planned to introduce:

- Project finance, object finance, commodities finance and income producing real estate: the highest of a 120 percent RW and the RW of the counterparty
- Land acquisition, development and construction finance: the higher of a 150 percent RW and the RW of the counterparty

Instead, they chose to use external ratings in the same way as corporate exposures and use the same look up table. Also an issue specific external rating for project, object and commodity finance. Where this is not available:

- Object and commodities finance: 120 percent RW



- Project finance: 150 percent in the pre-operational phase and 100 percent in the operational phase

### **7.7.3 Exposures to sovereigns and non-central government entities**

These are both outside the scope of the review the BCBS has done and current rules and regulations are therefore kept. (BCBS, 2014c)

# 8. Common equity tier 1 ratio

## 8.1 CET 1

Common equity tier 1 capital ratio is used to measure banks performance in regards to capital adequacy. There is also many requirements for this ratio which are mentioned under 5.4.5 Common equity tier 1 requirements.

The requirements are as follows:

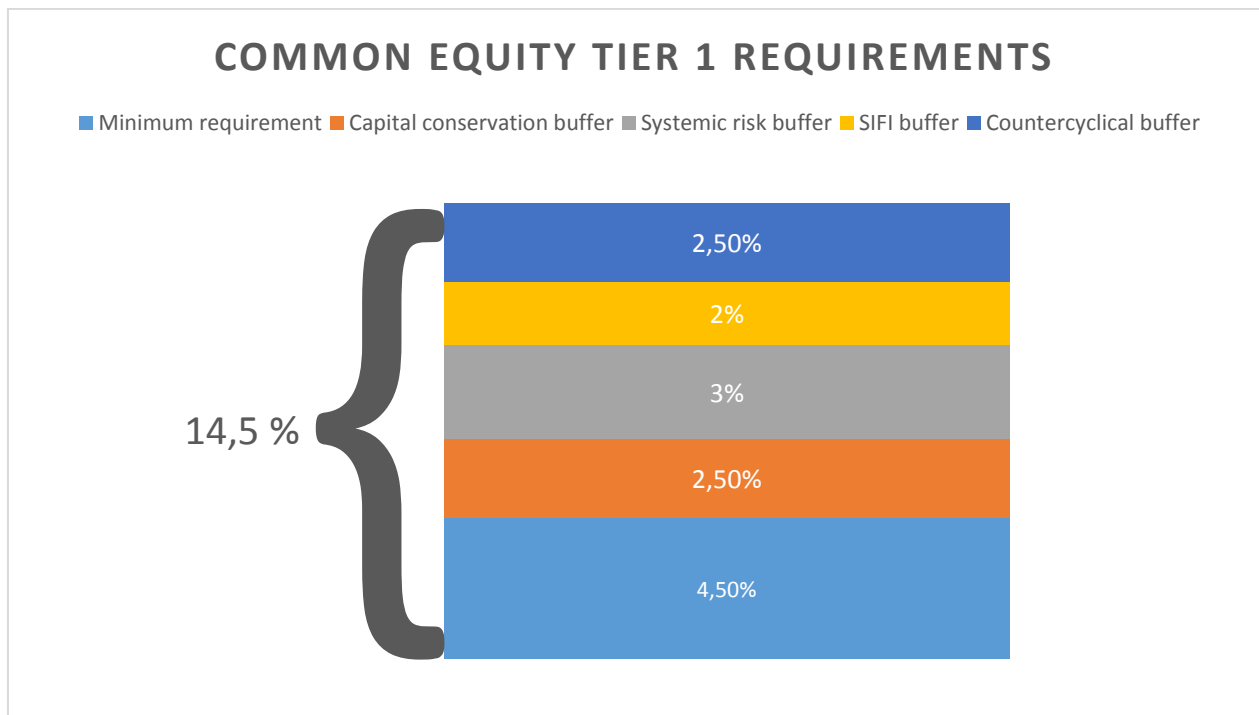


Figure 9 – CET 1 requirements

The requirement is that it is equal to or exceeds 14,5 percent.

## 8.2 CET1 ratio for credit risk

Since we in this thesis have decided to only focus on credit risk the first part we have to do is eliminate the market risk and the operational risk from the calculation of common equity ratio and the leverage ratio.

Sparebanken Sør compared with other saving banks in Norway present the following figures:

31.12.2016	CET1	Leverage ratio
Sør/South	14,7 %	8,6 %
SR-bank	14,7 %	7,3 %
Vest/West	14,9 %	7,3 %
Midt-Norge/Mid-Norway	14,9 %	7,4 %
Nord-Norge/Northern Norway	15,0 %	6,6 %
DNB	14,7 %	7,1 %

Table 13 - Savings banks and DNB (Sparebanken Sør, 2016b) (Sparebank SR-bank, 2016) (Sparebanken Nord-Norge, 2016) (Sparebanken Nord-Norge, 2016) (DNB, 2016a) (Sparebanken Vest, 2016)

These calculations are based on the current RWA of Sør which is at 62 000 million NOK. We therefore have to recalculate these values with only values regarding credit risk in order to achieve comparability. This is done by dividing the current minimum capital adequacy for credit risk with 8 percent. This will give us the RWA for only the credit risk.

$$RWA \text{ Credit risk: } 4651 \div 0,08 = 58138$$

Equation 10 - RWA credit risk Sparebanken Sør

The RWA for credit risk alone is 58138.

For the new CET1 ratio, we will continue to use the full common equity tier 1 capital:

$$CET1: 9114 \div 58138 = 15,7 \%$$

This is an increase of approximately 1 percent.

When compared to the other banks represented in the previous comparison the numbers will look like this. All numbers used in this calculation are found in their respective banks 4 quarter results, and are solved in the same way where the banks RWA for credit risk are calculated and then the new CET1 ratio.

31.12.2016	Old CET1	New CET1	Difference
Sør/South	14,7 %	15,7 %	1,00 %
SR-bank	14,7 %	17,9 %	3,22 %
Vest/West	14,9 %	19,0 %	4,10 %
Midt-Norge/Mid-Norway	14,9 %	17,9 %	2,96 %
Nord-Norge/Northern Norway	15,0 %	18,9 %	3,93 %
DNB	14,7 %	20,4 %	5,70 %

Table 14 - New CET1 ratios savings banks and DNB (Sparebanken Sør, 2016a) (Sparebank SR-bank, 2016) (Sparebanken Vest, 2016) (Sparebanken Midt-Norge, 2016) (Sparebanken Nord-Norge, 2016) (DNB, 2016b)

For the new CET1 ratios for Vest and Nord-Norge, we assume that the exposures listed as calculated under the standardized approach is all credit risk based. These are not large numbers and adding these numbers we feel, makes the numbers we have calculated more comparable to each other.

# 9. Revised Standardized Approach for Sparebanken Sør

## 9.1 Division between SA and IRB

According to Sparebanken Sør they want certain exposures to remain within the standardized approach portfolio.

Sector code 7000 nonprofits are characterized by non-market activities and services and products that are delivered either free or at a symbolic price (SSB, 2012). These companies retain their profits. Possible profits for non-profit organizations are mainly member fees, public transactions, private gifts or contributions. A big borrower for Sparebanken Sør is Kristen-Norges Innkjøpsfelleskap (KNIF) which has a total loan of about 4 billion NOK.

Other exposures they would like to retain in their standardized portfolio would be housing companies.

## 9.2 Mortgages

The following numbers are sent to us from Steinar Vigsnes. They represent the total mortgage portfolio of Sparebanken Sør divided into groups by their Loan-to-value ratio (LTV).

As assumption we have here is that all loans Sparebanken Sør has outstanding fulfill all the criteria for specialized treatment mentioned in 7.5 Residential real estate exposures. We have discussed with Sparebanken Sør and they agree this is a reasonable assumption.

The LTV ratio is the total amount of the loan left to pay divided by the value of the real estate.

Real estate exposures		
LTV	Amount	%
< 40 %	7 935 283 366	14,40 %
40-50%	5 693 768 356	10,40 %
50-60%	8 690 304 666	15,80 %
60-70%	14 440 345 642	26,30 %
70-75%	6 538 015 185	11,90 %
75-80%	3 583 482 592	6,50 %
80-85%	2 823 984 563	5,10 %
85-90%	1 991 861 440	3,60 %
90-95%	1 225 446 947	2,20 %
95-100%	1 110 207 413	2,00 %
>100%	953 347 968	1,70 %
	54 986 048 138	100 %

Table 15 - LTV ratios Sparebanken Sør

We had then divided these into differently categorized groups based on the look up table presented in 7.5 Real estate exposure class.

LTV	Amount	RW	RWA
< 40 %	7 935 283 366	25 %	1 983 820 842
40-60%	14 384 073 022	30 %	4 315 221 907
60-80%	24 561 843 419	35 %	8 596 645 197
80-90%	4 815 846 003	45 %	2 167 130 701
90-100%	2 335 654 360	55 %	1 284 609 898
>100%	953 347 968	100 %	953 347 968
SUM	54 986 048 138		19 300 776 512

Table 16 - New LTV ratios Sparebanken Sør

In regards to the real estate exposure class the new risk weights for Sparebanken Sør with regards to real estate exposures would be 35,10 percent. Here we can also see the RWA values for the exposures.

The value of the real estate was previously allowed to be adjusted upwards with good documentation every third year. This possibility will be removed in the Basel IV framework

(BCBS, 2015). This will remove the double effect that both the numerator and denominator of the equation goes in differing directions, both leading to a lower LTV value. And might place loans in a different LTV grouping and subsequently a lower RW.

For the Kristiansand area, the expected increase in real estate value is according to Huseierne between 3 and 4 percent (Huseiernes Landsforbund, 2017). Places like Oslo experience even higher increases in values and the loss of this effect could entail higher loan prices there.

We feel there are two ways around this issue. Either refinancing loans or changing banks to hold the loans. Refinancing would be a good option if they are allowed to change the value following the process of evaluating the real estate and this is then considered a new loan. In terms of interbank selling of loans, banks have to make their own estimates of the values of the real estate and this might be considered a new loan. How to deal with this would depend on Finanstilsynet's decisions when implementing.

### **9.3 Corporate exposures**

Since the whole of Sparebanken Sør's portfolio falls under the definition of SME's, from 7.3 Exposures to corporates, the new risk weight for all corporate exposures will be weighted 85 percent. (BCBS, 2015-6) However, some of the corporate exposures within Sparebanken Sør fall under the definition of corporate retail exposures and therefore be assigned a 75 percent risk weight. (BCBS, 2015-8)

The division is made clear to us by Steinar Jørgensen in an e-mail that is in the appendix.

### **9.4 Retail exposures**

Retail exposures will be weighted with a 75 percent risk weight as long as they do not fall under the definition of corporate SME's. (BCBS, 2015-8)

## 9.5 EAD

For the purpose of calculating the EAD for these numbers, we have chosen to use the current legislation for attaining risk weights. We then calculate the RWA with these risk weights to solve for EAD. We use the Norwegian capital adequacy regulations for calculation of present values of EAD. The risk weight for real estate exposure we have gotten from DNB standardized portfolio on recommendation from Marianne Lofthus.

This method has been chosen to make it easier to compare the current values, Basel III, with the future values, “Basel IV”.

	Cap req	RWA	RW CCR	Lovtekst	EAD
Exposures to states and central banks	0	0	0 %	§5-1	
Exposures to local and regional authorities	7	87,5	20 %	§5-2	438
Exposures to institutions	36	450	20 %	§5-6	2 250
Exposures to corporations	198	2475	90 %	§5-1	2 750
Retail exposures	473	5912,5	75 %	§5-8	7 883
Real estate exposures	3728	46600	45 %	§5-9, §5-10, DNB	103 556
Defaulted exposures	50	625	100 %	§5-11, §10-1	625
High risk exposures	0	0	150 %	§5-12	-
Exposures to covered bonds	67	837,5	10 %	§5-13	8 375
Exposures in equity positions	44	550	100 %	§5-14	550
Other exposures	48	600	100 %	§5-15	600
	4651	58137,5	46 %		127 026

Table 17 - EAD Sparebanken Sør (Kapitalkravsforskriften §5)

## 9.6 Risk-weighted assets - Basel IV Standardized approach

From what we have read, it appears that there will be no changes to high risk exposures, exposures to covered bonds and exposures in equity positions. We will therefore use the existing Norwegian framework for these. They will therefore have no effect on the calculations of the RWA.



	EAD	RW Basel IV	Legislation	RWA Basel IV
Exposures to states and central banks		0 %	BCBS 347 1	-
Exposures to local and regional authorities	438	20 %	BCBS 347 2	88
Exposures to institutions	2 250	50 %	BCBS 347 4	1 125
Exposures to corporations	2 750	81 %	BCBS 347 6	2 228
Retail exposures	7 883	75 %	BCBS 347 8	5 913
Real estate exposures	103 556	35 %	BCBS 347 9	36 348
Defaulted exposures	625	100 %	BCBS 347 12	625
High risk exposures	-	150 %	§5-12	-
Exposures to covered bonds	8 375	10 %	§5-13	838
Exposures in equity positions	550	100 %	§5-14	550
Other exposures	600	100 %	BCBS 347 13	600
	127 026	38 %		48 313

Table 18 - RWA Sparebanken Sør Basel IV (BCBS, 2015)

The RWA has decreased to 48 313 which we found very interesting, but not surprising. A big factor in this is, of course, the decreased risk weights for real estate exposures that follows from the revised categories that give risk weights according to the LTV ratios of the loans.

Presented below is the difference in RWA following the changes from Basel III to “Basel IV” for each exposure group.

	Diff %	Diff RWA
Exposures to states and central banks	0 %	
Exposures to local and regional authorities	0 %	-
Exposures to institutions	30 %	675
Exposures to corporations	-9 %	-248
Retail exposures	0 %	-
Real estate exposures	-10 %	-10 252
Defaulted exposures	0 %	-
High risk exposures	0 %	-
Exposures to covered bonds	0 %	-
Exposures in equity positions	0 %	-
Other exposures	0 %	-
	-17 %	-9 825

Table 19 – Difference in RWA Sparebanken Sør Basel IV

The risk weights for exposures to financial institutions is the only one that will increase. In our assumption for this calculation we have expected these institutions to be unranked, which we find to be a reasonable assumption. This is mainly due to the fact that few banks in Norway are ranked. On the basis of this we feel that banks and financial institutions that are unranked will be punished with these new risk weights. However, we feel that bigger, ranked banks will benefit from these changes. The financial institutions are placed in bucket A which is found under chapter 7.2 Exposures to banks. This is decided through recommendation from Inge Soteland.

“Basel IV” will lead to a more efficient capital allocation for Sparebanken Sør according to the proposed set of regulations from the BCBS. A relatively massive decrease in RWA of 17 percent and subsequently minimum regulatory capital will lead to freeing up a lot of capital for further allocation.

# 10. IRB approach for Sparebanken Sør

## 10.1 IRB risk weights

To calculate accurate risk weights under the IRB approach we would need to get access to all the information regarding Sparebanken Sør's loans. Both for private and corporate loans. Applying the IRB approach with limited information would lead to adverse effects in calculating the risk weights. Consulting with Steinar Jørgensen at Sparebanken Sør, we discussed potential ways of getting around this problem. One alternative was using average PD rates for different groupings of loans and therefore not revealing sensitive information with our thesis. Since the IRB formula includes the PD parameter several times, the end product would not be representative for any of the underlying loans.

We concluded that we would calculate the RWA using risk weights that was calculated in a previous exploration into the possibility of converting to the IRB approach. These are presented in the following subchapters. By doing this they avoided revealing too much information regarding their loans.

New requirements and rules, compared to when they made these calculations, make the conclusion of this thesis still relevant for Sparebanken Sør, especially considering the replacing of the transitional floor. Considering the numbers presented for corporate exposures we feel these numbers are still applicable. They have little exposure to oil and gas related industries in their corporate portfolio. We feel these industries usually have bigger bank loans than other industries. They are currently experiencing hard times, which can lead to increased PD and even defaults which carry an even higher risk weight, 150 or 100 percent with current rules.

In their own calculation of RWs following an application for the IRB approach, Sparebanken Sør might calculate different parameters, and therefore risk weights. They will then differ from what we are presented. We feel that such differences would not be decisive and only differ with few percentage points with regards to end products. However, we will account for this in our conclusion.

## 10.2 F-IRB

The numbers presented to us from risk management at Sparebanken Sør are as follows:

- Residential real estate exposures: 25 percent
- Other retail (corporate and private): 50 percent
- Corporate: 100 percent

The first thing to be done is summarizing the exposures presented in their Pillar 3 report into these three different groups. This is presented below. According to Sparebanken Sør, 1 700 of their corporate exposures classify as corporate retail, 4 000 are with non-profit groups such as Kristen Norges Innkjøpsfelleskap (KNIF) and 900 are with housing cooperatives (all numbers presented in million NOK). Non-profits and housing cooperatives are to remain in a standardized portfolio while the rest enter the new F-IRB portfolio.

	EAD	Corporate	Mortgages	Retail
Exposures to states and central banks				
Exposures to local and regional authorities	438	438		
Exposures to institutions	2 250	2 250		
Exposures to corporations	2 750	1 050		1 700
Retail exposures	7 883			7 883
Real estate exposures	103 556		103 556	
Defaulted exposures	625	625		
High risk exposures	-			
Exposures to covered bonds	8 375	8 375		
Exposures in equity positions	550	550		
Other exposures	600	600		
	127 026	13888	103556	9583

Table 20 - Division into Corporate, Mortgages and Retail

Subtracting the housing cooperatives and non-profits leaves us with this F-IRB portfolio:

F-IRB portfolio	EAD	Risk weights	RWA
Corporate	8 988	100 %	8 988
Mortgages	103 556	25 %	25 889
Retail	9 583	50 %	4 792
			39 669

*Table 21 - F-IRB portfolio*

And standardized portfolio:

SA portfolio	EAD	Risk weights	RWA
Housing cooperative	900	35 %	315
Non-profits	4 000	100 %	4 000

*Table 22 - Standardized portfolio F-IRB*

Giving us a total RWA of:

RWA F-IRB portfolio	39 669
RWA SA portfolio	4 315
<b>Total RWA</b>	<b>43 984</b>

*Table 23 - RWA F-IRB approach*

## 10.3 A-IRB

The way of calculating RWA for mortgages and retail exposures under any IRB approach is, as mentioned earlier, the same. Therefore, the risk weights presented to us from Sparebanken Sør only apply to corporate exposures. The number presented to us is 80 percent.

A-IRB portfolio	EAD	Risk weights	RWA
Corporate	8 988	80 %	7 190
Mortgages	103 556	25 %	25 889
Retail	9 583	50 %	4 792
			37 871

*Table 24 - A-IRB portfolio*

And the same standardized portfolio

SA portfolio	EAD	Risk weights	RWA
Housing cooperative	900	35 %	315
Non-profits	4 000	100 %	4 000

*Table 25 - Standardized portfolio A-IRB*

Which gives us the following total portfolio under the A-IRB approach:

RWA A-IRB portfolio	37 871
RWA SA portfolio	4 315
RWA total	42 186

*Table 26 - RWA A-IRB approach*

# 11. Results

## 11.1 Effect of capital output floor

Standardized Basel IV	48 313
Upper floor (90 %)	43 482
Lower floor (60 %)	28 988
F-IRB as % of SA	91 %
A-IRB as % of SA	87 %

*Table 27 - Effect of capital output floor*

As is apparent from the numbers presented in our thesis there are potential advantages following a transition into the IRB approach. When considering the introduction of the capital floor it is clear that, with our numbers, the only approach affected by this introduction will be the A-IRB approach. The floor only takes effect if the floor factor is set higher than 87 percent of the SA.

With the F-IRB approach, the capital output floor would not apply.

## 11.2 Common equity tier 1

Calculating common equity tier 1 with the new RWA give the following numbers:

CET1 SA for credit risk	15,7 %
CET1 SA Basel IV	18,9 %
CET1 F-IRB	20,7 %
CET1 A-IRB	21,6 %

*Table 28 - Common equity different approaches*

Comparing these to the numbers for other banks in 7.3 “New values” we can notice an enormous increase in the CET1 ratio compared to themselves, other savings banks and DNB.

To show how much more efficient their capital allocation could be when fully optimized, i.e. common equity only fulfills the 14,5 percent requirement, we will use the following equation for all methods used in our thesis.

$$RWA \text{ credit risk} \times 14,5 \% = \text{Minimum CET1}$$

*Equation 12 - Minimum CET1 ratio credit risk*

Which gives us the following numbers.

CET1 SA	8 430
CET1 SA Basel IV	7 005
CET1 F-IRB	6 378
CET1 A-IRB	6 117

*Table 29 - Minimum CET1 ratio for credit risk - different approaches*

Increasing possible capital allocation for credit risk:

Capital allocation increase SA Basel IV	1 425
Capital allocation increase F-IRB	2 052
Capital allocation increase A-IRB	2 313

*Table 30 - Possible increase in capital allocation for credit risk*

## 11.3 Minimum capital adequacy for credit risk

The following is the new minimum capital adequacy requirements for credit risk with the different approaches.



	RWA	Minimum capital adequacy
SA current	58 138	4 651
SA Basel IV	48 313	3 865
F-IRB	43 984	3 519
A-IRB	42 186	3 375

Table 31 - Minimum capital adequacy for credit risk

## 11.4 Leverage ratio

The reduction in CET1 needed following a reduction in RWA might still be affected by the leverage ratio requirements.

The reduction in CET1 needed is:

CET1 SA	8 430	100 %
CET1 SA Basel IV	7 005	83 %
CET1 F-IRB	6 378	76 %
CET1 A-IRB	6 117	73 %

Table 32 - Reduction in common equity in percent

Assuming that there will be a corresponding percentage wise reduction in the CET1 needed from operational and market risk using the fourth quarter common equity from Sparebanken Sør, 9 939.

CET1 SA	9 939	100 %
CET1 SA Basel IV	8 259	83 %
CET1 F-IRB	7 519	76 %
CET1 A-IRB	7 212	73 %

Table 33 - New common equity tier 1 for all risk

Calculating the new leverage ratios when using the 8,61 percent origin:

Leverage ratio SA	8,61 %
Leverage ratio SA Basel IV	7,15 %
Leverage ratio F-IRB	6,51 %
Leverage ratio A-IRB	6,25 %

*Table 34 - New leverage ratios*

# 12. Conclusion

## 12.1 Main findings

This thesis has investigated the transition from the current standardized approach to the IRB approach for Sparebanken Sør, considering the new “Basel IV” regulations. The goal of this thesis was to reveal which approach will lead to the most efficient capital allocation for Sparebanken Sør. The concern of Sparebanken Sør is that the current RWA over exaggerates their underlying risk, and converting approaches will reduce them to a more accurate level.

Based on our calculations the most efficient value for the RWA is achieved by the A-IRB approach. Sparebanken Sør would also benefit from the F-IRB approach, which is usually a step on the way to the A-IRB approach. Sparebanken Sør will therefore be able to provide the community with more comprehensive provision of liquidity. This is a result of the decrease in the RWA and minimum requirements that are calculated as percentages of this.

The maximum proposed floor factor, 90 percent, will be about where the A-IRB and F-IRB approach are compared to the standardized approach (87 and 91 percent). The floor factor might affect the RWA of Sparebanken Sør. This by increasing the RWA to 90 percent of the standardized approach. This would only be relevant in the case of the A-IRB approach. It would however still be lower than the standardized approach.

An interesting note is that we calculated a decrease in the new standardized approach regulations as well as the IRB approaches. Starting out on this thesis, we focused a lot on PWC’s “Basel IV” leader Martin Neisen’s views on these new regulations. They observed an increase in their test calculations for banks and this became our view when starting this thesis. We feel that our conclusion of a lower RWA for Sparebanken Sør is correct seeing as how Norwegian banks are on the higher end of the spectrum considering different measurement criteria related to capital requirements.

The new proposed regulations that increase the leverage ratio to 6 percent will not affect these calculations following the calculations in 11.4 leverage ratio.

Assuming that Finanstilsynet approves Sparebanken Sør's IRB models, we conclude that they should switch to the F-IRB approach and later apply for the A-IRB approach.

## **12.2 Possible sources of error**

This thesis has assumed that Finanstilsynet and other institutions would follow the rules presented by BCBS fully. However this might not be the case. If they were to introduce national discretions we feel, as well as Inge Soteland, that they would be on the higher end of what is proposed by BCBS.

For comparability with future regulations we had to assume that the different exposure groups contained only exposures with one risk weight. This means that neither the current nor the future EAD values are 100 percent accurate. We feel however that this was a necessary step in our calculations.

Assumptions has been made throughout the thesis, either by talking to relevant people at Sparebanken Sør or at our own. This makes calculations not fully reliable.

A more accurate way of conducting this thesis would require access to all of Sparebanken Sør's loan data, for calculating our own IRB parameters. The question here is if we would be able to make more accurate predictions of the IRB parameters than what Sparebanken Sør has done.

However, in our conclusion, we have accounted for this and we feel that this thesis will still be relevant for Sparebanken Sør.

## **12.3 Further research**

This thesis has only investigated the impact on Sparebanken Sør and it is hard to say if this is representative for the bank sector in general. Other banks currently using the IRB approach will be interested in how the new capital output floor affects their RWA. Further, we have excluded market and operational risk, which is also subject to changes in Basel IV. Namely the Fundamental Review of the Trading Book (FTRB), seeing changes as moving from value at risk (VaR) to expected

shortfall (ES) and also making the banking book trading book boundary clearly defined (BCBS, 2013). The Basel framework is comprehensive and time-consuming to fully understand. Future research should therefore concentrate on both operational risk and market risk.

Proposals in Basel IV, if implemented as proposed, can also merit further research. An interesting observation during research was an increase in risk weights for acquisition, development and construction (ADC). In our calculations there was a reduction in the average risk weights for mortgages. If these are introduced as proposed we feel an interesting research topic could look further into how this would affect the real estate market. Seeing as how it might become more expensive to build houses, following a possible increase in interest on ADC loans, and cheaper mortgages. We feel the supply would decrease, because of fewer new houses, and that demand for housing would increase. If this is the case regions like Oslo would be interesting to look at, seeing as how it already has enormous growth in housing prices.

The goal of the committee is to produce comparable requirements across jurisdictions. Further research could focus on the effect of national supervisors discretionary measures, and how this affects these goals. Competition between banks in surrounding countries could also be looked into. According to our contacts at Sparebanken Sør Swedish based banks, like Nordea, have differing capital requirements than Norwegian ones may give them competitive advantages in this market.

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# Appendix

## Appendix 1 IRB risk weights

Hei!

Jeg viser til møtet på mandag ifm deres masteroppgave, hvor jeg skulle komme tilbake med en del info.

Tilbakemelding:

Konverteringsfaktor for hhv PM og BM etter standardmetoden: Anvend 0,4 både for PM og BM.

Volum 'Foretak som massemarked': 1,7 mrd

Volum KNIF som er sektorkode 7000: 4 mrd

Volum borettslag: 900 mill

Ift IRB analyser var en mulig løsning at dere la til grunn snitt PD for porteføljen, (snitt) LGD etc for hhv PM og BM og så beregne ulike verdier/case.

Vi har tidligere gjort beregninger av risikovekter for de ulike kategoriene etter IRB grunnleggende og IRB avansert, så da mener jeg at dere kan bruke risikovektene fra den analysen - dvs problemstillingen med snitt PD etc bortfaller. Og jeg vil si heldige studenter! Ift IRB RWA beregninger trenger dere kun å finne utlån og engasjement, og dette finner dere nok i årsrapporten.

Risikovekter IRB grunnleggende.

PM boliglån 25%

Massemarked øvrig (PM og små BM) 50 %

BM foretak 100 %

Risikovekter IRB avansert:

BM foretak 80%

For PM boliglån og Massemarked øvrig (PM og små BM) er det kun en IRB metode.

mvh

Steinar Jørgensen | Spesialrådgiver Risikostyring | Sparebanken Sør

## Appendix 2 LTV

Hei,

Vedlagt følger LTV fordeling som avtalt.

Boliglån

LTV Beløp i %

Under 40 %	7.935.283.366	14,4 %
40-50 %	5.693.768.356	10,4 %
50-60 %	8.690.304.666	15,8 %
60-70 %	14.440.345.642	26,3 %
70-75 %	6.538.015.185	11,9 %
75-80 %	3.583.482.592	6,5 %
80-85 %	2.823.984.563	5,1 %
85-90 %	1.991.861.440	3,6 %
90-95 %	1.225.446.947	2,2 %
95-100 %	1.110.207.413	2,0 %
Over 100 %	953.347.968	1,7 %



54.986.048.137      100,0 %

Måtte sjekke med risikostyring i forhold til datagrunnlag og vi var enige om at det beste grunnlaget er det du/dere her får oversendt.

Mvh

Steinar

Steinar Vigsnes | Økonomisjef | Sparebanken Sør

## **Appendix 3 Basel III, Basel IV, F-IRB and A-IRB Sparebanken Sør**

Exposures to states and central banks	Cap req	RWA	RW CCR	Lovtekst	EAD		
Exposures to local and regional authorities	0	0	0 %	\$5-1			
Exposures to institutions	7	87,5	20 %	\$5-2	438		
Exposures to corporations	36	450	20 %	\$5-6	2 250		
Exposures to covered bonds	198	2475	90 %	\$5-1	2 750		
Retail exposures	473	5912,5	75 %	\$5-8	7 883		
Real estate exposures	3728	46600	45 %	\$5-9, \$5-10, DNB	103 556		
Defaulted exposures	50	625	100 %	\$5-11, \$10-1	625		
High risk exposures	0	0	150 %	\$5-12	-		
Exposures to covered bonds	67	837,5	10 %	\$5-13	8 375		
Exposures in equity positions	44	550	100 %	\$5-14	550		
Other exposures	48	600	100 %	\$5-15	600		
	4651	58137,5	46 %		127 026		
	EAD	RW Basel IV	Legislation	RWA Basel IV	Diff %	Diff RWA	Cap req
Exposures to states and central banks		0 %	BCBS 347 1	-	0 %	-	-
Exposures to local and regional authorities	438	20 %	BCBS 347 2	88	0 %	-	7
Exposures to institutions	2 250	50 %	BCBS 347 4	1 125	30 %	675	90
Exposures to corporations	2 750	81 %	BCBS 347 6	2 228	-9 %	-248	178
Retail exposures	7 883	75 %	BCBS 347 8	5 913	0 %	-	473
Real estate exposures	103 556	35 %	BCBS 347 9	36 348	-10 %	-10 252	2 908
Defaulted exposures	625	100 %	BCBS 347 12	625	0 %	-	50
High risk exposures	-	150 %	\$5-12	-	0 %	-	-
Exposures to covered bonds	8 375	10 %	\$5-13	838	0 %	-	67
Exposures in equity positions	550	100 %	\$5-14	550	0 %	-	44
Other exposures	600	100 %	BCBS 347 13	600	0 %	-	48
	127 026	38 %		48 313	-17 %	-9 825	3 865
	Diff %	Diff RWA	Cap req				
Exposures to states and central banks	0 %	-	-				
Exposures to local and regional authorities	0 %	-	7				
Exposures to institutions	30 %	675	90				
Exposures to corporations	-9 %	-248	178				
Retail exposures	0 %	-	473				
Real estate exposures	-10 %	-10 252	2 908				
Defaulted exposures	0 %	-	50				
High risk exposures	0 %	-	-				
Exposures to covered bonds	0 %	-	67				
Exposures in equity positions	0 %	-	44				
Other exposures	0 %	-	48				
	-17 %	-9 825	3 865				
	EAD	Corporate	Mortgages	Retail			
Exposures to states and central banks							
Exposures to local and regional authorities	438	438					
Exposures to institutions	2 250	2 250					
Exposures to corporations	2 750	1 050		1 700			
Retail exposures	7 883			7 883			
Real estate exposures	103 556		103 556				
Defaulted exposures	625	625					
High risk exposures	-						
Exposures to covered bonds	8 375	8 375					
Exposures in equity positions	550	550					
Other exposures	600	600					
	127 026	13888	103556	9583			
F-IRB portfolio	EAD	Risk weights	RWA				
Corporate	8 988	100 %	8 988				
Mortgages	103 556	25 %	25 889				
Retail	9 583	50 %	4 792				
			39 669				
SA portfolio	EAD	Risk weights	RWA				
Housing cooperative	900	35 %	315				
Non-profits	4 000	100 %	4 000				
RWA F-IRB portfolio	39 669						
RWA SA portfolio	4 315						
Total RWA	43 984						
A-IRB portfolio	EAD	Risk weights	RWA				
Corporate	8 988	80 %	7 190				
Mortgages	103 556	25 %	25 889				
Retail	9 583	50 %	4 792				
			37 871				
SA portfolio	EAD	Risk weights	RWA				
Housing cooperative	900	35 %	315				
Non-profits	4 000	100 %	4 000				
RWA A-IRB portfolio	37 871						
RWA SA portfolio	4 315						
RWA total	42 186						
Standardized Basel IV	48 313						
Upper floor (90 %)	43 482						
Lower floor (60 %)	28 988						
F-IRB as % of SA	91 %						
A-IRB as % of SA	87 %						
Common equity SA for credit risk	15,7 %		8 430				
Common equity SA Basel IV	18,9 %						
Common equity F-IRB	20,7 %						
Common equity A-IRB	21,6 %						
Common equity SA	8 430						
Common equity SA Basel IV	7 005						
Common equity F-IRB	6 378						
Common equity A-IRB	6 117						
Core equity SA	8 430						
Core equity SA Basel IV	7 005						
Core equity F-IRB	6 378						



## Appendix 5 Capital adequacy Sparebanken Sør

<b>Netto ansvarlig kapital</b>	<b>9.388</b>	<b>8.626</b>	<b>2.003</b>
<b>Minimumskrav ansvarlig kapital Basel II beregnet etter standardmetoden:</b>			
Engasjement med lokale og regionale myndigheter	7	7	
Engasjement med institusjoner	40	66	5
Engasjement med foretak	251	251	
Engasjement med massemarked	519	596	25
Engasjement med pantesikkerhet i eiendom	3.515	2.758	758
Engasjement som er forfalt	72	71	
Engasjement som er høyrisiko	0	0	
Engasjement i obligasjoner med fortrinnsrett	62	237	
Engasjement i egenkapitalposisjoner	36	137	
Engasjement øvrig	51	51	0
<b>Kapitalkrav for kreditt- og motpartsrisiko</b>	<b>4.553</b>	<b>4.174</b>	<b>788</b>
Kapitalkrav for posisjons-, valuta- og varerisiko	4	4	0
Kapitalkrav for operasjonell risiko	252	196	55
CVA tillegg	47	29	18
Fradrag i kapitalkravet	0	0	0
<b>Sum minimumskrav til ansvarlig kapital</b>	<b>4.856</b>	<b>4.404</b>	<b>861</b>
Risikovektet balanse (beregningsgrunnlag)	60.704	55.048	10.768
Ren kjernekapitaldekning i %	12,68 %	12,60 %	18,60 %
Kjernekapitaldekning i %	13,52 %	13,53 %	18,60 %
Kapitaldekning i %	15,47 %	15,67 %	18,60 %

## Appendix 6 Old and new CET1 ratio

31.12.2016	CET1		
Sør/South	14,7 %	8,6 %	
SR-bank	14,7 %	7,3 %	
Vest/West	14,9 %	7,3 %	
Midt-Norge/Mid-Norway	14,9 %	7,4 %	
Nord-Norge/Northern Norway	15,0 %	6,6 %	
DNB	14,7 %	7,1 %	
31.12.2016	Old CET1	New CET1	Difference
Sør/South	14,7 %	15,7 %	1,00 %
SR-bank	14,7 %	17,9 %	3,22 %
Vest/West	14,9 %	19,0 %	4,10 %
Midt-Norge/Mid-Norway	14,9 %	17,9 %	2,96 %
Nord-Norge/Northern Norway	15,0 %	18,9 %	3,93 %
DNB	14,7 %	20,4 %	5,70 %

## Appendix 7 Sparebanken Sør's balance sheet

<b><i>Eiendeler</i></b>			
Kontanter og fordringer på sentralbanker	797	Other assets	1410
Utlån til kredittinstitusjoner	156	Deposits/loans to financial institutions	11971
Netto utlån til kunder	90928	Securities valued at fair value	1146
Obligasjoner og sertifikater	11815	Loan to norwegian households	90928
Aksjer	542		105455
Finansielle derivater	604		
Eierinteresser i konsernselskaper	0		
Eierinteresser i tilknyttede selskaper	9		
Immaterielle eiendeler	21		
Eiendel ved utsatt skatt	0		
Varige driftsmidler	472		
Andre eiendeler	111		
<b>Sum eiendeler</b>	<b>105455</b>		
<b><i>Gjeld og egenkapital</i></b>			
Gjeld til kredittinstitusjoner	178	Customer deposits	51562
Innskudd fra kunder	51562	Deposits/loans from financial institutions	178
Gjeld stiftet ved utstedelse av verdipapirer	41217	Other debt	628
Finansielle derivater	616	Securities issued	41833
Betalbar skatt	269	Responsible loan capital	1203
Annen gjeld	258	Equity	10051
Avsetninger for forpliktelser	77		105455
Utsatt skatt	24		
Ansvarlig lånekapital	1203		
<b>Sum gjeld</b>	<b>95404</b>		
Eierandelskapital	1491		
Hybridkapital	825		
Annen egenkapital	7735		
<b>Sum egenkapital</b>	<b>10051</b>		
<b>Sum gjeld og egenkapital</b>	<b>105455</b>		

## Appendix 8 Reflection note Andreas Olsen

Banks can either use the Internal rating based (IRB) or the standardized approach for calculating their risk-weighted assets (RWA). However, banks need approval from the national supervisors, in our case Finanstilsynet, to apply the IRB approach.

Finanstilsynet set certain requirements that banks must fulfill in order to get approval for the IRB approach. They need to have well established protocols for calculating parameters in the IRB approach for at least three last years. The application period takes about one year. There are more requirements, but in this thesis, we will focus on these two. The introduction of the IRB models in daily operations will then be in 2020. This means that they will be subject to different capital

requirements because of the introduction of, what is called in professional environments, “Basel IV”. When considering the introduction of the IRB approach, we focused on the year 2020.

Sparebanken Sør is interested in the possibility of changing their approach from the standardized approach to the IRB approach. They feel the standardized approach does not accurately reflect their risk exposures when calculating their RWA. If they were to change to IRB methods, their own models would more accurately reflect the risk they accept by issuing a loan or making an investment.

For the purpose of this thesis, we focused solely on credit risk.

The potential benefits that are gained by reducing their RWA is better capital allocation which means that Sparebanken Sør can contribute more liquidity into the economy and therefore, in this case, contribute to growth in the counties Vest-Agder, Aust-Agder and Telemark.

The findings we had in this conclusion was a reduction in RWA for Sparebanken Sør. The RWA is used to calculate many requirements for the bank and a lower RWA leads to a more efficient capital allocation for the bank. Which means they can spend more of their available assets by giving loans to the counties in which they operate.

This thesis is based on documents published that might end up as laws for all banks in Europe. All banks in Norway might therefore be affected by this. Seeing how Sparebanken Sør fares under these new rules is interesting. Finanstilsynet has a final say in how these rules are implemented. The capital output floor that is being introduced was theorized to increase RWA for banks in Europe, but in the case of Sparebanken Sør it lead to a decrease. Which means that Norwegian banks competitiveness might increase following the implementation of these rules.

This subject is one that not many people know about, and in the banks there is not a big department that works with these calculations. However we feel that consultancy firms like PWC, EY etc. will be able to consult the banks if they want to consider changing their approaches like we tested for Sparebanken Sør.

Our thesis might contribute to Sparebanken Sør changing their approach in capital adequacy regulations.

The financial crisis of 2008 can reflect some of the ethical challenges that arise in this field. Banks had overleveraged their positions with off balance sheet items, and risk was not accurately reflected in their capital requirements. Banks went bankrupt and the housing bubble burst.

Banks importance in modern societies give them the responsibility to sufficiently plan their liquidity and other aspects so that depositors and others will not suffer.

## **Appendix 9 Reflection note Lasse Storm Olsen**

Banker kan enten bruke interne- eller Standardiserte beregningsmetoder når de skal regne ut sine risikovektede eiendeler. Andelen kapital bankene må holde tilbake regnes ut med bakrunn av disse. Et høyere tall for de risikovektede eiendelene innebærer høyere andel kapital som må holdes tilbake. Denne kapitalen kan da ikke brukes til å utstede lån til for eksempel firmaer eller privatpersoner. Dersom banken klarer å senke verdien på sine risikovektede eiendeler vil også andelen kapital som holdes tilbake senket. Banken vil da få mulighet til å utstede flere lån og bidra til vekst.

I dag benytter Sparebanken Sør seg av den standardiserte metoden for å regne ut verdien på sine risikovektede eiendeler. Finanstilsynet krever at bankene oppfyller visse krav for at de skal få lov til å benytte seg av denne metoden. Søknadsprosessen kan ta opptil 4 år ettersom banken må bevise for finanstilsynet at deres interne beregningsmetoder er presise og konsistente. Målet med den interne beregningsmetoden er at de risikovektede eiendelene reflekterer den faktiske risikoen bankene er utsatt for. For å få mest mulig kunnskap om forslagene til det nye regelverket, Basel IV, har vi lest høringsrapportene som er utgitt av Basel komiteen. Etter å ha fullført våre beregninger kom vi frem til at Sparebanken Sør vil kunne bidra til vekst i lokalområdene dersom de bytter til de interne beregningsmetodene. De interne beregningsmetodene kan dessuten føre til

at Sparebanken Sør tilegner seg til og med enda høyere kompetanse når det kommer til risikostyring.

## Innovasjon

I takt med at baselregleverkene har endret seg har finansinstitusjoner over hele verden stadig kommet på nye metoder for å ”gå rundt” regelverket. Nye endringer som følge av Basel IV har også som mål å eliminere disse. Mye kan tyde på at finansinstitusjoner er eksperter på å finne smutthull i regelverk. Dette kan føre til svært ”innovative” måter som kanskje til og med vil prege hvordan vi ser på fagfeltet finans og også hvordan en jobb innen bank og finans kommer til å se ut i fremtiden.

## Ansvar

Banker er, og vil også fortsette å være blant de viktigste institusjonene i det moderne samfunnet. Banker sørger for at folk flest på en sikker måte kan plassere pengene sine, og sørger for at vi får muligheten til å realisere ting som ellers ikke ville vært mulig. Banker har et stort samfunnsansvar ettersom pengene de sitter på i stor grad er innskudd fra befolkningen. Dersom banker ikke tar god hensyn til risiko i sine daglige oppgaver vil dette ha store konsekvenser for de som oppbevarer pengene sine i banken. På bakgrunn av dette er det viktig at bankene opptrer med god moral, og ikke involverer seg i aktiviteter med overdreven risiko, slik at deres handlinger ikke påvirker kundene og samfunnet forøvrig i negativ forstand.

## Internasjonale trender

Reglene som følger med Basel IV kommer til å påvirke alle europeiske banker til en viss grad. Basel-komiteén ønsker å bidra til at banknæringen blir mer transparent enn den er i dag. Under dagens regelverk har store banker relativt store konkurransefortrinn ovenfor mindre banker. Basel IV tar sikte på å eliminere disse konkurranseskjevhetene.

I utgangspunktet ønsker Basel-komiteén at banker skal holde tilbake mer kapital i fremtiden.



Dette kan også observeres i forbindelse med at nye krav til kapital har blitt fremsatt som følge av stadig reviderte regelverk.