



**Copenhagen
Business School**
HANDELSHØJSKOLEN

Basel III: Mapping the effects to stability, output and lending in the Nordics



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**Supervised by John
Kristensen (Copenhagen
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by Martin Mikael Lilius

The thesis establishes the rationale of financial regulation; the features of Basel II and III frameworks; the roles of capital and liquidity in banking and maps the expected costs and benefits of Basel III and higher capital ratios among the major Nordic banks since 2006.

Table of Contents

Abstract	3
1. Introduction	4
1.1. Thesis structure	4
1.2. Topic delimitation.....	5
2. Rationale of regulation.....	6
2.1. The Financial system	6
2.2. The Objectives of financial regulation.....	7
2.3. Systemic problems, negative externalities and market failures	9
3. Basel II	14
3.1. Background of the Basel Committee and Basel II rules	14
3.2. The purpose and aims of the Basel II rules	15
3.3. Pillar 1: Minimum Capital Requirements	16
3.3.1. Credit, Operational and Market risks	16
3.3.2. What qualifies as capital in Basel II?	18
3.3.3. Deductions from capital	21
3.4. Pillar 2: Supervisory review	22
3.5. Pillar 3: Market discipline	23
4. Basel III	25
4.1. Background.....	25
4.2. What is new?	26
4.2.1. New definition of capital	26
4.2.2. Conservation buffer	26
4.2.3. Countercyclical buffer	26
4.2.4. Leverage Ratio	27
4.2.5. Liquidity Coverage Ratio and Net Stable Funding Ratio.....	28
4.2.6. Enhanced risk coverage.....	29
4.3. From Basel II to Basel III	31
5. Capital and liquidity in banking	34

5.1.	The roles of capital and liquidity	34
5.2.	The determinants of capital structure	35
5.3.	Market based versus regulatory capital requirements.....	37
5.4.	Costs and benefits of additional capital	38
5.4.1.	The costs of higher capital requirements and liquidity regulation	40
5.4.2.	The benefits of higher capital requirements and liquidity regulation	43
5.4.3.	Summary of estimated costs and benefits.....	47
5.5.	Optimal bank capital	49
6.	Mapping the effects of Basel III to stability, output and lending in the Nordics	52
6.1.	The Evolution of capital ratios and stability in the Nordics 2006-2011	52
6.2.	The Benefits of higher capital ratios in the Nordics	55
6.3.	The Effects of higher capital ratios to cost of capital, lending margins and output in the Nordics	59
6.4.	Capital ratios and bank lending in the Nordics	60
6.5.	Summary	64
7.	Academic and industry views on Basel III	66
7.1.	Academic critique on Basel III	66
7.2.	Industry views and practical approaches to the challenges posed by Basel III to the financial sector	68
8.	Discussion & Conclusion: what can we expect from Basel III in the Nordics.....	73
	References:.....	77
	Appendix	82

This thesis is dedicated:

To friends and family,
To the women of my life,
To the institutions of education that dared open their doors to me,
To the companies that hired me,
To Vaasa, Copenhagen, London and New York.

My sincerest thanks for all of the lessons.

ABSTRACT

The study begins by establishing the background for the study by laying out the basic premises that govern financial regulation, and thus the Basel framework; the promotion of consumer welfare and institutional stability, correction of negative externalities and market failures. Achieving these basic objectives in an efficient manner is believed to create more benefits than costs to the society at large, and this belief that the financial system and the economy may benefit from good regulation is the justifying argument for financial regulation at the most basic level.

After this background is established, both Basel II and III frameworks are covered to map out the structure of regulation and the changes brought about by the new Basel III rules. These changes include higher capital requirements, new liquidity requirements, tighter capital definitions and recalibrated risk weights for assets, among many others. These changes are scheduled to be implemented around the globe between 2012 and 2019. After pinpointing the main targets of Basel regulation, the attention turns to the primary objects of regulation; capital and liquidity in banking. The study covers the basic capital structure dilemma between equity and debt, the costs and benefits of higher equity capital ratios and liquidity requirements, and provides a collation of academic estimates about an optimal capital ratio that would bring a more stable financial system without suffocating lending activity. Clearly higher levels of bank equity capital compared to Basel II-era capital requirements seem reasonable and justified according to various academic sources.

The study closes with a look into the Nordic region with regards to financial stability, long run output and lending. This is achieved by mapping the evolution of capital levels among the major Nordic banks to estimates of crisis probabilities, costs and effects to lending activity. Average core capital ratios among seven major Nordic banks are found to have increased significantly, from 7,4% in 2006 to an average of 12,5% in 2011. The Swedish banking sector in particular is found to be in a robust capital condition. This increase in core capital ratios is estimated to bring a significant reduction in systemic financial crisis likelihood, to the tune of 85% less than in 2006. The less frequent financial crises are expected to result in higher long run level of GDP, but this effect is tempered by higher cost of capital and lending margins by around 25 to 125 basis points. The net effects of higher capital levels are expected to be positive however, with approximately 2% to 4% higher long run GDP level compared to what may have been expected by the capital ratios of 2006, if the Nordic financial system is considered in a closed context, and the variety of base assumptions and estimations are believed to hold.

1. INTRODUCTION

Since the onset of the financial crisis in 2007, calls and cases for better financial regulation have been made and it has become clear that the financial sector is in a phase of profound change around the world. A significant driver of change in the financial sector is the new Basel III regulation regarding capital adequacy and liquidity. Having survived the financial crisis relatively well, the Nordic banking sector faces adjustment to these new global rules.

The aim of the thesis is to explore the effects of adjusting to the new Basel III rules; what are its costs and benefits, and is it actually a reasonable way of achieving the objectives behind the regulation. The study starts by establishing the regulatory background and the features of both Basel II and Basel III and then follows with a study into the roles of capital and liquidity in banking. The thesis is finally pulled together with a look into the evolution of capital ratios in the Nordics, and the related effects with regards to financial sector stability, output and lending in particular. Taken as a whole, the thesis gives an overview of the Basel III regulation, its positive and negative aspects and likely effects, and places it into a Nordic context.

The topic is relevant as a more difficult operational environment for banks may increase the costs of financing for the wider economy, and of course in light of the recent crisis and focus on financial sector issues at large. Ultimately the thesis should answer the questions: Will Basel III effectively help to stabilize the financial sector against future crises and can we estimate the effects of its implementation to economic output and bank lending in the Nordics?

1.1. Thesis structure

The thesis will begin by laying out the framework for financial regulation as a whole in Chapter 2; the rationale and aims for regulation on a general level, what has been achieved with Basel II and Basel III is covered in Chapters 3 and 4, followed by a look into the roles of capital and liquidity in banking in Chapter 5. After this groundwork is laid out, the thesis will map the potential effects of Basel III to Nordic countries with regards to economic stability, output and lending, which is done in Chapter 6. Before conclusion a quick look is taken in Chapter 7 into the critique Basel III has received, both from the academics studying the financial system and from the people in the everyday business of running said financial system. Finally the thesis is concluded with a discussion about the Basel III regulatory framework in a Nordic context; is it

a meaningful way of achieving financial stability, what are its costs and benefits, and what does it all mean for the Nordic banking sector. This discussion is done in Chapter 8.

1.2. Topic delimitation

The Basel I – III regulatory framework is a grand project that has been ongoing since the publication of the first set of regulatory guidelines in the late 1980s. The regulation has expanded along the way and today touches many aspects of banking and financial businesses. Therefore it is impossible to study every aspect of these guidelines in depth within one 70 to 80 page thesis structure. This thesis provides a broad background on the Basel II and III rules and the rationale guiding regulatory work. From there on, the focus is strictly on capital and liquidity issues, and their relation to bank lending and economic output. In the empiric part of the study, a further delimitation is made by focusing on capital, lending and output relationships with Basel III in a Nordic context, rather than taking a global view, and forgoing an in depth look into potential liquidity related issues. Several studies of a similar nature have been made with US, UK and global context. This study provides a view with a Nordic focus, as a result of the author's interest in global financial issues within a local context.

That is to say that this thesis is mainly about capital ratios, and their relationship to bank stability and lending, and in the end, to the level of economic output. The Basel III framework covers a wide range of banking activities and products, each of which with their own wide range of effects and issues which certainly are worthy of studying. This thesis however takes the broadest possible view; taking a look into the GDP level effects of capital ratios. The reason for this broadest of views is simple; to make the best sense of what Basel regulatory frameworks are about as a whole, and what is their effect on our economies. A more detailed study would be impossible within the thesis page limitation, or alternatively, within the thesis page limitation only a limited portion of the effects of Basel III might be studied in depth. The broad view on regulation and the effects of Basel III in the Nordics as established within this study may provide a useful general view on the issues, and in turn lay the groundwork for more detailed studies on the effects of particular pieces of the regulatory framework.

The thesis emphasises relevant academic papers and the approaches used in these publications to produce its view of Basel III, capital ratios and their effects on the Nordics, with some supplementary empirical data to provide actual references to the phenomena discussed.

2. RATIONALE OF REGULATION

2.1. The Financial system

Financial regulation has not been as current a topic of debate since the days of the Great Depression of the 1930's. The reason is obvious: the financial crisis that has engulfed the world since 2007 is still an ongoing issue, and as a result, financial stability has become an issue of utmost interest. New and reformed financial regulation is perceived widely as the way towards a more secure financial system. It is clear that a more stable and secure financial system without the risk of a crisis would be ideal. What is unclear, is the question whether this is actually possible, and what are the costs of a more constrained and regulated financial system. As such, financial regulation and its effects remains a contested issue, to which this study aims to provide a particular view from a Nordic vantage point.

The financial crisis, the following debt crisis and continuing market turmoil have made it clear that the wellbeing of the financial system is central to the efficient and smooth functioning of the whole economy. Moreover the financial system and its development is essential for economic growth in general, and historically the countries with the most advanced financial institutions have been the economic and political leaders of the world, as presented for example by Rousseau and Sylla (2001) and Levine (1997). This is to underline the fact that financial institutions matter a great deal.

What makes the financial system, and the various institutions (retail, commercial and investment banks, asset managers, private equity and hedge funds, insurance and pension institutions etc.) operating within it, essential is the fact that it provides services that help governments, companies and individuals make investments that ultimately lead to successful infrastructure projects, new and better factories, and to senior citizens able to support themselves comfortably off the fruits of the work they did during their earlier years. In short, financial services help transform labor and risk-taking into growth and prosperity, on a scale that spans from the individual to the collective. On the most basic level this is achieved by matching the needs of those with excess capital (savings and deposits) and of those with shortfall of capital (a wealth of investment opportunities but lack of capital). The excess capital earns a return when put to work on investment projects and as a result everyone is better off. As the world has developed forward, so has the financial system. Today practically every participant in the financial markets uses a wide variety of services and instruments to realize a

wide range of savings and investment objectives. A personal credit card (that provides short term loans in the form of overdraft facility) helps with everyday liquidity and payments needs, while savings in the form of investments in stocks and bonds build long term wealth, and at the same time provide growth enabling capital to the companies that issued them. As the variety of financial services has increased, so has the reliance on them. This means that the modern day economy is completely and deeply dependent on the smooth and continuous functioning of the financial services industry. As such, the need to ensure proper functioning of the financial system is paramount. Thus financial regulation must at the base always be about ensuring the proper functioning of the financial system. A reasonable starting point for a study about the effects of financial regulation and Basel III rules is to establish a more detailed rationale and aims of financial regulation in general.

2.2. The Objectives of financial regulation

A top level view on the basis of regulation is provided by OECD (Organization for Economic Coordination and Development, a 34 member country international organization aiming to promote economic growth and development) in its policy document for financial regulation. Regulation should address market failures and broader economic and social needs. Market failures are inherent problems of the financial markets, such as asymmetric information or spillovers and negative externalities, which require intervention. Economic needs can be based for example on competition policy issues, industrial policy or development targets. Social needs for financial regulation could be based on issues such as access to financial products, savings promotion or equity (OECD 2010: 17). It must be kept in mind, that due to its nature, OECD views are likely to represent the general policy consensus found in the political circles of its member states, rather than a radical new take on the subject.

A more detailed view on the issue of financial regulation is taken by Llewellyn (1999), who separates regulatory objectives and rationale. He asserts that the debate about financial regulation and its usefulness revolves around four key issues: 1) how financial institutions and markets operate in practice 2) incentives faced by financial firms 3) the extent of market failures and the capacity of regulation to address them 4) the extent to which financial products and contracts are different from their counterparts in other industries. Regulatory objectives are the outcomes that regulation is trying to achieve, while the rationale establishes why regulation is necessary to achieve the objectives, and thus forms the justification for regulation. Finally the reasons for regulation explain why regulation happens in actual reality. Llewellyn establishes three key objectives for financial regulation: 1) sustaining systemic

stability 2) safety and soundness of financial institutions and 3) consumer protection (Llewellyn, 1999: 8-9).

Brunnermeier, Crockett, Goodhart, Persaud and Shin (2009: 2) provide another take on the objectives of financial regulation, and describe the main purposes of regulation as 1) prevention of distortions to competition and maintenance of market integrity 2) to protect the welfare of ordinary citizens 3) to intervene when social costs of market failures exceed private costs.

At the most basic level, regulation exists because it is believed that the actions taken to control the financial industry will result in a better economic environment and enhanced welfare for consumers and companies alike. In other words, the benefits of regulation are believed to outweigh its costs. Taking the three different views presented above together, it can be said that the major objectives of financial regulation are the following:

Correcting negative externalities: Mentioned in different ways by Llewellyn *“sustaining systemic stability”*, OECD *“Market failures”*, and Brunnermeier et al *“social costs of market failures exceeding private costs”*. At the most basic level, a negative externality rises from actions by single entities, which do not take into account the negative consequences of the actions to others. In effect, the actual total cost of the action is not properly factored into the cost-benefit analysis by the decision maker. This is likely the most acute of the dimensions of financial regulation, as these issues were largely behind the latest financial crisis. Negative externalities call for regulation that addresses the financial markets as a whole, or macro prudential regulation.

Promoting institutional stability: Very much interlinked with market failures and negative externalities; the problems and failures of individual firms can lead to significant second round effects within the financial system through negative externalities. Promoting institutional stability calls for regulation affecting individual financial firms and institutions, or micro prudential regulation. This corresponds roughly to *“Safety and soundness of financial institutions”* as mentioned by Llewellyn, and to a lesser extent *“prevention of distortions to competition and maintenance of market integrity”* by Brunnermeier et al. Basel rules with their capital and liquidity regulations try to address these issues, by making individual financial institutions resilient, and therefore, the whole system resilient.

Correcting market failures and promoting the welfare of consumers: As per OECD’s *“social needs”* and *“market failures”*, Llewellyn’s *“consumer protection”* and Brunnermeier and

company's *"welfare of ordinary citizens"*. There are severe information asymmetry issues between consumers and the companies providing financial services and products, and as with any other industry, the consumers are entitled to protection from abuse. Going beyond this, the financial products and services have many unique features which lead to specific financial regulation that is essential for the proper functioning of the financial system.

These three general objectives of financial regulation all require different approaches and tools to meet them, due to the separate natures of the underlying problems. Basel II and III rules focus on the micro and macro prudential issues of the financial markets. Next the study shall focus on the issues underlying the objectives of financial regulation – the actual problems that regulation is trying to straighten out.

2.3. Systemic problems, negative externalities and market failures

Modern financial systems are widely and deeply connected between borders and different financial firms. Claims and obligations take various forms from debt to derivatives, in a sophisticated network structure. This interconnectedness, extensive intra-industry trade and the dynamics between supply, demand and prices means that unlike in other industries, the failure of a competitor (and counterparty) can have serious negative effects on the other players in the financial industry. In traditional industries, on the contrary, the failure of a competitor will often strengthen the remaining firms. These cumulative negative feedback loops that arise from the failure of a firm within the financial industry can also be called negative externalities.

Due to the network structure of the global financial market, losses and distress in one financial institution can spread to other firms via counterparty exposures, as asset write downs or default in one firm may force others into trouble and further asset write downs or defaults. Thus the failure of one firm may spread across the network and be reinforced, especially if financial system assets are illiquid. The contagion effects of firm failures and asset write downs in financial networks have two distinct properties that work in opposite directions: on one hand, the connectivity and risk sharing mitigates the effects of financial failures by distributing the losses widely; however, a high number of connections can also spread the contagion and failures faster and more widely, exacerbating potential second round default effects (Gai and Kapadia, 2010: 3-4).

These negative feedback loops and second round effects mean that the total costs of a financial firm failure are higher than the private costs incurred by the failing institution. As a result of the network effects and feedback loops uncontrollable by the single firm, the total social cost of failure is not incorporated in the decision making of the single failing financial firm; the risks posed by the failure of a single financial firm are thus often incorrectly priced, estimated and understood. The disparity between social and private costs is especially pronounced with banks. This is because banks have an essential role in the economy as they provide a large percentage of finance in the economy, and most importantly manage the payments system. These features make bank failures disruptive not only to other financial firms, but to the wider economy (Llewellyn, 1999: 13).

As a justification for the need of systemic financial regulation specifically for banks, Llewellyn (1999) provides four different avenues of systemic risk with banks:

First mentioned by Llewellyn is the central position of banks with regards to the finance, payment, clearing and settlement systems within the economy, as mentioned in the prior paragraph.

Second, the systemic issues arising from potential bank runs. If a bank is suspected to be insolvent or about to fail, depositors may want to withdraw their money from the bank to safeguard their wealth. This wave of withdrawals may cause an otherwise solvent bank to become insolvent as its assets can be difficult to sell to cover the withdrawals. This difficulty of disposing a large amount of assets in a short period of time generally arises from the lack of interested buyers, and tends to lead to discounted prices for the assets in question, to make things worse. A panic or loss of trust on one bank can easily translate to mistrust of other similar institutions – and runs on other banks – causing the problems to exacerbate without a real reason.

Third, the nature of bank contracts and balance sheets. Banks' liabilities are generally deposits that can be withdrawn on a short notice, and other short term funding, while its assets are generally of much longer maturity and more difficult to dispose of in a quick manner. This maturity mismatch has inherent potential for instability.

Fourth, adverse selection and moral hazard issues. To mitigate the threat of bank runs, officials have put deposit insurance schemes in place all over the world. The public's deposits are guaranteed by the state in order to make the deposits safe even in the case of a bank failure, to reduce the incentives to withdraw deposits in times of uncertainty. The downside of deposit

insurance is that it may induce to take more risks and operate with less capital, while depositors may seek banks that are riskier and offer higher interest rates, as their deposits are backed by the state.

Similarly, when banks feel that they are backed by a lender of last resort (generally a central bank) in case of trouble, the existence of one may induce the banks to a more reckless and risky behavior. Both deposit insurance and lender of last resort arrangements have thus noticeable moral hazard issues, which may lead to adverse selection problems and inappropriate bank behavior.

Brunnermeier et al (2009) offer a very much complementary view on the same issues, and explain five different negative externalities in financial and banking industry. Informational contagion is the first negative externality mentioned. Should one bank fail, it throws doubt on the solvency of other banks that are thought to be of the same type. When this doubt arises, depositors and lenders start withdrawing their funds causing liquidity problems for the remaining banks. This process may then lead to moves in relative interest rates and block access to funds, which may eventually lead to solvency problems where none existed beforehand.

The second negative externality is the loss of access to future funding by the customers of the failed bank. Acquiring replacement bank services and credit facilities can be costly, especially when relation specific client information is lost with the bank failure. These problems are exacerbated in a time of panic, when credit conditions tend to be especially tight.

The third negative externality arises from the significant intra-industry trade between banks and other financial firms. As explained earlier, this can have a positive effect by risk sharing, but at the same time it enables the effective spread of contagion and can lead to severe second round effects.

The fourth negative externality comes in the form of liquidation issues, or fire sale externalities. Banks and other financial institutions can respond to liquidity issues by selling their assets. The negative externality arises from the fact that forced large scale sales will drive down the market prices of the assets sold, which in turn will affect the price of the same assets held by other banks and financial institutions, if they are valued on a mark-to-market basis. Thus the attempt to deal with a liquidity problem can create solvency problems as asset prices go down. The decline in asset prices after the initial sale may in turn lead to further asset sales or deleveraging, in a self-amplifying process called liquidity spiral.

The fifth and final negative externality explained by Brunnermeier and company is the restriction of credit extension to improve capital ratios. In addition to selling assets and raising new capital, a bank may seek to adjust its balance sheet by restricting asset growth, or new credit extension. This is usually done by higher margins and raised interest rates, and other types of costs to borrowers. These higher lending costs will then translate to higher probabilities of default and lower output in the rest of the economy.

These features of the financial markets can lead to potentially catastrophic crises, as was seen with the events of 2007 and after. The problems that originated at the US housing market quickly spread across the tightly connected global financial industry, and have now morphed into a sovereign debt crisis in Europe as a result of government interventions to save troubled banks.

The ultimate goal of regulation is to be of benefit to those utilizing financial services. To achieve this, a multitude of market failures, affecting especially retail customers, have attracted regulatory attention. Llewellyn (1999: 21-22) provides a handy list of these market failures that create a reason for regulation:

- Inadequate information on part of the consumer
- Asymmetric information between suppliers of financial services and the consumers of said services
- Agency costs related to the asymmetric information problem (exploitation)
- Principal-agent issues and other conflicts of interest between financial market participants
- Problems of ascertaining quality at the time of purchase
- Imprecise definitions of products and contracts
- Inability of retail consumers to assess the safety and soundness of financial institutions at a reasonable cost
- Consumer under investment in information acquisition and resulting free rider problems
- Because of complexity of some financial products, consumers may be unable to assess quality

This is a short presentation of the main problems and issues that are at the root of the problems within the financial system, and between financial services providers and those seeking the services in question. As noted before the Basel rules focus on individual firm capital levels and liquidity management, in other words, on the solvency and stability of the

individual institutions covered by the regulation. The clear assumption of the Basel Committee is that by making the individual institution resilient, the whole system becomes resilient. The existing Basel approach however leaves many issues regarding negative externalities, market failures and information asymmetries directly unaddressed. Considering that for example fire sale externalities and information asymmetries between derivative and mortgage loan trading counterparties were at the heart of the recent crisis, it is questionable whether the Basel framework is a constructive approach to financial regulation. No doubt these issues are understood by the Basel Committee, and it is reasonable to assume that every single problematic issue within the financial system cannot be addressed in a practical manner within one regulatory framework. It is however clear, that the Basel framework is far from comprehensively addressing the potential sources of trouble within the financial system. To make sense of what the Basel rules actually achieve, the study continues with a short presentation of the main features of both Basel II and Basel III rules.

3. BASEL II

3.1. Background of the Basel Committee and Basel II rules

Basel II rules are a continuation of the regulatory work by the Basel Committee, established by the central-bank Governors of the Group of Ten countries at the end of 1974, which initially culminated in the Basel I capital requirements of 1988. The Basel I rules can be seen as an international response to the increasing globalization of finance and the world economy, and the financial and economic troubles of the 1970's. Basel rules are recommendations on regulation to national banking authorities. The Committee's current members come from Argentina, Australia, Belgium, Brazil, Canada, China, France, Germany, Hong Kong SAR, India, Indonesia, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. Countries are represented by their central bank and also by the authority with formal responsibility for the prudential supervision of banking business where this is not the central bank. While every nation of the world is not represented in the Committee, the Basel rules are widely adopted and followed around the globe, as they represent the guidelines of regulation in the most advanced financial systems of the world.

The Basel Committee itself does not possess any formal international supervisory authority, and its conclusions do not have legal force. Rather, the committee studies and defines broad supervisory standards and guidelines and makes recommendations on best practice with regards to financial regulation. The expectation is that the individual central banks and relevant authorities will implement them in a way that is best suited to their own national financial systems. In this way, the Committee encourages convergence towards common approaches and common standards without attempting detailed harmonization of member countries' supervisory approaches.

The Basel Committee itself reports to the central bank governors and heads of supervision of its member countries, and seeks their endorsement for its major initiatives. These decisions cover a very wide range of financial issues. The committee's work is driven by the pursuit of two basic principles: no foreign banking establishment should escape supervision; and that supervision should be adequate. To achieve these objectives, the Basel committee has issued a long series of documents and recommendations since 1975.

In 1988, the Basel committee introduced a capital measurement system commonly referred to as the Basel Capital Accord. This system provided for the implementation of a credit risk measurement framework with a minimum capital standard of 8% by year end 1992. Since 1988, this framework has been progressively introduced not only in member countries but also in virtually all other countries with internationally active banks. In June 1999, the Committee issued a proposal for a revised Capital Adequacy Framework. The proposed capital framework consists of three pillars: minimum capital requirements, which seek to refine the standardized rules set forth in the 1988 Accord, supervisory review of an institution's internal assessment process and capital adequacy, and effective use of disclosure to strengthen market discipline as a complement to supervisory efforts. Following extensive interaction with banks, industry groups and supervisory authorities that are not members of the Committee, the revised framework was published on June 2004, with several minor revisions and updates up until 2009 (the chapter adapted from material at Bank for International Settlements' website¹)

3.2. The purpose and aims of the Basel II rules

The purpose of the Basel II framework is aptly described by the Basel committee in the Comprehensive Version of the Revised Framework (2006: 2) as following:

“The fundamental objective of the Committee’s work to revise the 1988 Accord has been to develop a framework that would further strengthen the soundness and stability of the international banking system while maintaining sufficient consistency that capital adequacy regulation will not be a significant source of competitive inequality among internationally active banks. The Committee believes that the revised Framework will promote the adoption of stronger risk management practices by the banking industry, and views this as one of its major benefits. The Committee notes that, in their comments on the proposals, banks and other interested parties have welcomed the concept and rationale of the three pillars (minimum capital requirements, supervisory review, and market discipline) approach on which the revised Framework is based. More generally, they have expressed support for improving capital regulation to take into account changes in banking and risk management practices while at the same time preserving the benefits of a framework that can be applied as uniformly as possible at the national level.

In developing the revised Framework, the Committee has sought to arrive at significantly more risk-sensitive capital requirements that are conceptually sound and at the same time pay due regard to particular features of the present supervisory and accounting systems in individual member countries. It believes that this objective has been achieved. The Committee is also retaining key elements of the 1988 capital adequacy framework, including the general requirement for banks to hold total capital equivalent to at least 8% of their risk-weighted

¹ Available online at <http://www.bis.org/bcbs/history.htm>

assets; the basic structure of the 1996 Market Risk Amendment regarding the treatment of market risk; and the definition of eligible capital.”

As per above, the Basel II rules apply to internationally active banks and are broken down to three parts: Pillar 1 focusing on minimum capital requirements, Pillar 2 tackles supervisory issues, and finally Pillar 3 handles market disclosure issues.

3.3. Pillar 1: Minimum Capital Requirements

Pillar 1 of the Basel framework is at the core of the regulatory approach by Basel Committee. It defines the minimum capital amount to be held by internationally active banks, and provides guidance on how to assign risk weights to different assets to determine the correct capital-to-risk-weighted-assets ratio. Minimum capital requirements are assigned for market, credit and operational risks, with total capital ratio of at least 8% of risk weighted assets. Assets are classified into different classes and assigned “risk weights” according to their perceived inherent riskiness. Capital charges are accumulated for the whole asset portfolio, to arrive at the minimum capital level, which must be met with the required amount of instruments qualifying as capital, generally meaning equity and the safest of debt instruments. The Capital Adequacy Ratio (CAR) is defined by the following formula: Qualifying Regulatory Capital / Risk Weighted Assets. The central Basel II requirement is that $CAR > 8\%$.

3.3.1. Credit, Operational and Market risks

The risk weights to credit, operational and market risks defined by the Basel II guidelines can be determined by separate methods, or approaches, which is a fact that potentially means slightly different regulatory treatment of the same asset between different banks using different methods. These methods are in practice based either on standardized weights, using external ratings (i.e. Standard & Poor’s, Moody’s, Fitch) or on internal risk rating calculations by the banks themselves, to which the Basel committee provides guidance. The internal ratings based approaches rely on advanced risk management techniques and risk modeling by the banks themselves, and they enable the banks utilizing these approaches to have a slight advantage in capital measurement. This is by the Basel committee’s design, as it is seen to incentivize more advanced risk management practices and thus make the banks more resilient.

Credit risk flows from the borrower and transaction characteristics of the asset in question. At the most basic level, the more likely a borrower is to default, the riskier the loan granted is,

and the worse the credit rating of the instrument. External ratings based credit risk approach is based on credit ratings by external credit rating agencies. The credit risks are represented by the credit ratings given to borrowers. AAA or equivalent is the best rating, and C/D denominated rating the worst. These public ratings are usually given both for the long and short term. The Basel II guidelines give an option to determine the credit risk and associated capital charges either through external credit ratings by ratings agencies, or by internal ratings based method, which is based on sophisticated internal credit risk calculations by the banks themselves. The standardized external ratings based Basel II credit risk weights are described in the following table.

Table 1: Credit risk weights in Basel II, in percent. Adapted from Atkinson and Blundell-Wignall, 2010: 11.

Security	Basel II Ext Ratings Based	
Most government/Central Bank		
AAA to AA-	0	
A+ to A-	20	
BBB+ to BBB-	50	
BB+ to B- (or unrated)	100	
Below B-	150	
Other public claims		
Claims on Multinational Development Banks		
Most OECD Banks and Securities firms	< 90 days	Other
AAA to AA-	20	20
A+ to A-	20	50
BBB+ to BBB- (or unrated)	20	50
BB+ to B-	50	100
Below B-	150	150
Corporates		
AAA to AA-	20	
A+ to A-	50	
BBB+ to BB- (or unrated)	100	
Below BB-	150	
Residential Mortgages (fully secured)	35	
Retail Lending (consumer)	75	
Corporate and Commercial Real Estate		
AAA to AA-	20	
A+ to A-	50	
BBB+ to BB- (or unrated)	100	
Below BB-	150	

The Basel II guidelines define operational risk as “the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk, but excludes strategic and reputation risk for capital charge purposes”. Operational

risk can be measured in Basel II by three different methods: the Basic indicator approach, the standardized approach and by Advanced Measurement Approaches. The capital requirements rising from operational risks are determined as a percentage of gross income or by other measures of the scale and risk of the operations.

Market risk is the risk of financial loss arising from a bank's trading activities, where the bank acts either on its own account or on behalf of its clients in the commodity, foreign exchange, equity, capital and money markets. Market risk arises from adverse movements in market prices, which in effect means changes in interest and foreign exchange rates, equity, bond and commodity prices.

Capital requirements with respect to market risks, are applied as follows:

- a) In the case of interest rate related instruments and equities to the current market value of banks' trading books.
- b) In the case of foreign exchange and commodities risk to banks' total currency and commodity positions.

There are a number of valuation methodologies that a bank may apply with regards to determining the value and risk of the assets in question. These are: marking to market, marking to model and independent price verification. There are two methods to determine the capital charges with regards to market risks, which are the standardized approach and the internal model approach.

3.3.2. What qualifies as capital in Basel II?

According to the Basel committee and the Basel II rules the key elements of capital on which the main emphasis is placed are equity capital and disclosed reserves. These key elements of capital are the only elements that are common to all countries' banking systems. These elements are wholly visible in the published accounts and are the basis on which most market judgments of capital adequacy are made internationally. In addition, equity capital has a crucial bearing on profit margins and a bank's ability to compete. The non-equity and disclosed reserve capital instruments are other types of reserves and subordinated debt instruments. The eligible capital instruments are ranked into tiers (1-3) according to their perceived quality and ability to potentially absorb losses. Tier 1 ("core") capital must form at least a minimum of 50% of the total capital base, and conversely, Tier 2-3 ("supplementary") capital can form 50%

of the total capital base at the maximum. The following descriptions of capital tiers have been adapted from the Basel committee's revised framework (2006) and from Styger and Vosloo (2005):

Tier 1

The tier 1 capital consists of permanent shareholders' equity (issued and fully paid ordinary shares or common stock and perpetual non-cumulative preference shares) and of disclosed reserves (created or increased by appropriations of retained earnings or other surplus, e.g. share premiums, retained profit, general reserves and legal reserves). In the case of consolidated accounts, this also includes minority interests in the equity of subsidiaries that are less than wholly owned. It is worth noting that revaluation reserves and cumulative preference shares are considered as tier 2 capital.

Tier 2

Tier 2 capital is comprised of undisclosed reserves, revaluation reserves, hybrid capital instruments and long maturity subordinated debt instruments.

Undisclosed reserves are eligible as tier 2 capital, provided these reserves are specifically accepted by the national supervisor. These reserves consist of that part of the accumulated after-tax surplus of retained profits which banks in some countries may be permitted to maintain as an undisclosed reserve. This definition of undisclosed reserves excludes values arising from holdings of securities in the balance sheet at below current market prices.

Revaluation reserves arise in two ways. Firstly, in some countries, banks (and other commercial companies) are permitted to revalue fixed assets, normally their own premises, from time to time in line with the change in market values. Revaluations of this kind are reflected on the face of the balance sheet as a revaluation reserve, including, at national discretion, allocations to or from reserve during the course of the year from current year's retained profit. Secondly, hidden values of "latent" revaluation reserves may be present as a result of long-term holdings of equity securities valued in the balance sheet at the historic cost of acquisition. Both types of revaluation reserve may be included in tier 2 provided that the assets are prudently valued, fully reflecting the possibility of price fluctuation and forced sale.

Hybrid (debt/equity) capital instruments. This heading includes a range of instruments that combine characteristics of equity capital and of debt. Their precise specifications differ from country to country, but they should meet the following requirements:

- unsecured, subordinated and fully paid-up
- not redeemable at the initiative of the holder or without the prior consent of the supervisory authority
- available to participate in losses without the bank being obliged to cease trading (unlike conventional subordinated debt)
- although the capital instrument may carry an obligation to pay interest that cannot permanently be reduced or waived (unlike dividends on ordinary shareholders' equity), it should allow service obligations to be deferred (as with cumulative preference shares) where the profitability of the bank would not support payment.

Subordinated term debt: includes conventional unsecured subordinated debt capital instruments with a minimum original fixed term to maturity of over five years and limited life redeemable preference shares. These instruments are limited to a maximum of 50% of the amount of Tier 1 capital.

Tier 3

Tier 3 capital is short term subordinated debt capital, which will be subject to the following conditions:

- a) It should have an original maturity of at least two years and will be limited to 250% of the bank's tier 1 capital that is allocated to support market risk.
- b) It is only eligible to cover market risk, including foreign exchange risk and commodities risk.
- c) Insofar as the overall limits in the 1988 Accord are not breached, tier 2 elements may be substituted for tier 3 up to the same limit of 250%.

d) It is subject to a "lock-in" provision which stipulates that neither interest nor principal may be paid if such payment means that the bank's overall capital would then amount to less than its minimum capital requirement.

3.3.3. Deductions from capital

The Basel II rules include the following deductions from the capital base for the purpose of calculating the risk-weighted capital ratio. The deductions will consist of:

- 1) Goodwill, as a deduction from Tier 1 capital elements.
- 2) Increase in equity capital resulting from a securitization exposure, as a deduction from Tier 1 capital elements.
- 3) Investments in subsidiaries engaged in banking and financial activities which are not consolidated in national systems. The normal practice is to consolidate subsidiaries for the purpose of assessing the capital adequacy of banking groups. Where this is not done, deduction is essential to prevent the multiple use of the same capital resources in different parts of the group. The assets representing the investments in subsidiary companies whose capital had been deducted from that of the parent should not be included in total assets for the purposes of computing the ratio.

Table 2: Eligible regulatory capital instruments. Author's contribution.

Capital Tier	Eligible Instrument
Tier 1	
Minimum of 50 % of capital base or 4% of risk weighted assets	Shareholder's equity Disclosed reserves
Tier 2	
Maximum of 50% of capital base	Undisclosed reserves Revaluation reserves Hybrid capital instruments Subordinated term debt
Tier 3	
Can only be used to cover market risk	Short-term subordinated debt
Note: Tier 1-3 capital in total must be > 8% of risk weighted assets.	

3.4. Pillar 2: Supervisory review

Pillar 2 of the Basel II rules focuses on the issues of supervisory review, risk management guidance, and supervisory transparency and accountability, relating these especially to banking risks, interest rate risks, credit risks and operational risks, where these risks are not adequately addressed by the first pillar. While the first pillar intends to ensure that the banks have adequate capital to support the risks in their business, the second pillar aims to complement the first by encouraging better risk management techniques by the banks and by better supervision and monitoring by the responsible authorities.

The Basel II rules specify three areas especially suited to treatment under pillar 2: risks considered under Pillar 1 that are not fully captured by the Pillar 1 process (e.g. credit concentration risk); those factors not taken into account by the Pillar 1 process (e.g. interest rate risk in the banking book, business and strategic risk); and factors external to the bank (e.g. business cycle effects). Additionally, an important aspect of Pillar 2 is the assessment of compliance with the minimum standards and disclosure requirements of the more advanced methods in Pillar 1. National supervisors must ensure that these requirements are being met, both as qualifying criteria and on a continuing basis.

The Basel II rules establish four key principles of supervisory review, which complement those outlined in the extensive supervisory guidance that has been developed by the Committee in separate documents (the Core Principles for Effective Banking Supervision and the Core Principles Methodology). The four principles are following:

Principle 1: Banks should have a process for assessing their overall capital adequacy in relation to their risk profile and a strategy for maintaining their capital levels.

Principle 2: Supervisors should review and evaluate banks' internal capital adequacy assessments and strategies, as well as their ability to monitor and ensure their compliance with regulatory capital ratios. Supervisors should take appropriate supervisory action if they are not satisfied with the result of this process.

Principle 3: Supervisors should expect banks to operate above the minimum regulatory capital ratios and should have the ability to require banks to hold capital in excess of the minimum.

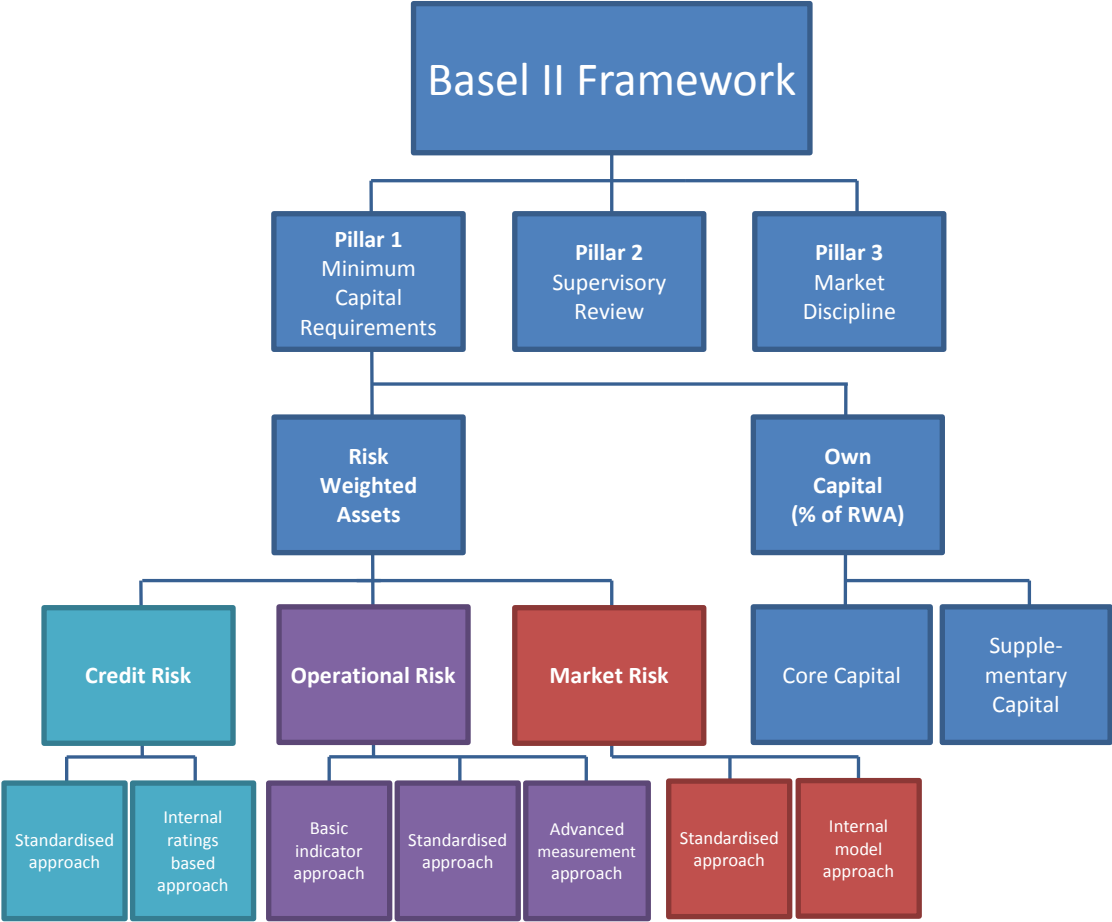
Principle 4: Supervisors should seek to intervene at an early stage to prevent capital from falling below the minimum levels required to support the risk characteristics of a particular bank and should demand rapid remedial action if capital is not maintained or restored.

3.5. Pillar 3: Market discipline

As with pillar 2, the purpose of pillar 3 – market discipline is to complement the minimum capital requirements (Pillar 1) and the supervisory review process (Pillar 2). With Pillar 3 the Basel committee aims to encourage market discipline by developing a set of disclosure requirements which allow market participants to assess key pieces of information on the scope of application, capital, risk exposures, risk assessment processes, and hence the capital adequacy of a financial institution. The thinking behind this approach is based on a belief that such disclosures have especially strong relevance where reliance on internal ratings methodologies gives banks more discretion in assessing capital requirements.

The Basel II rules outline several areas of qualitative and quantitative disclosure that are deemed essential for outsider and market participant assessment of a given financial institution. The areas of disclosure cover the general scope of Basel compliance, capital adequacy, capital structure, credit risk and so on. The aim of these disclosures is to impose market discipline upon the financial institutions participating in the markets; compliance with the Basel rules and proper disclosure about an institution's risks and results in a better reputation and associated benefits. An institution declining to disclose information about its operations is seen as a risky by the other market participants.

Graph 1: The structure of Basel II. Adapted from Dierick et al, 2005: 10.



4. BASEL III

4.1. Background

Creating a framework for international finance and related guidelines for regulation has been an ongoing project since the formation of the Basel committee, and working papers, studies, updates and clarifications regarding the guidelines have been published regularly throughout the past 38 years. The recent financial crisis made it obvious that the work is far from finished. The Basel committee recognized this, and responded with Basel III guidelines published in 2010. The purpose of the Basel III in their own words is (Basel III: A global regulatory framework for more resilient banks and banking systems, 2010: 1):

“together with the document *Basel III: International framework for liquidity risk measurement, standards and monitoring*, [Basel III: A global regulatory framework for more resilient banks and banking systems] presents the Basel Committee’s reforms to strengthen global capital and liquidity rules with the goal of promoting a more resilient banking sector. The objective of the reforms is to improve the banking sector’s ability to absorb shocks arising from financial and economic stress, whatever the source, thus reducing the risk of spillover from the financial sector to the real economy.”

Financial stability is of course what Basel rules have always been about, but the choice of words in the introduction has clearly changed from Basel II days. Ability to absorb shocks whatever the source and spillovers are specifically mentioned for the first time. Furthermore, the reforms made explicitly target issues that rose during the financial crisis, as evidenced by the following (Basel III: A global regulatory framework for more resilient banks and banking systems, 2010: 2):

“To address the market failures revealed by the crisis, the Committee is introducing a number of fundamental reforms to the international regulatory framework. The reforms strengthen bank-level, or microprudential, regulation, which will help raise the resilience of individual banking institutions to periods of stress. The reforms also have a macroprudential focus, addressing system-wide risks that can build up across the banking sector as well as the procyclical amplification of these risks over time.”

Liquidity, macroprudential and procyclical issues were clearly exposed as matters of utmost importance during the crisis, but did not receive much attention from the Basel committee during the Basel I-II era. Accordingly, the Basel III framework attempts to reform financial regulation to tackle these and other issues of financial stability. The next section of this study will give a brief overview of the changes to regulatory guidelines brought on by Basel III.

4.2. What is new?

4.2.1. New definition of capital

Basel III redefines regulatory capital. Tier 1 capital consists of common equity and narrows the earlier Basel II “disclosed reserves” down to only retained earnings. This narrowing down of Tier 1 to just common equity and retained earnings is a result of the crisis, which showed that credit losses and write downs came out of retained earnings and that there were inconsistencies in the definition of capital between different countries, which made it difficult for market participants to assess the quality of capital between institutions. The new minimum amount of Tier 1 capital is now 6% of risk weighted assets, and $\frac{3}{4}$ of it, or 4,5 % of risk weighted assets, must consist of common equity.

Tier 3 capital instruments, which were only available to cover market risks in Basel II, will be eliminated from the framework. To improve market discipline, the Basel committee will improve the transparency of the capital base, with all elements of capital required to be disclosed along with a detailed reconciliation to the reported accounts. Tier 1 and 2 capital must total at least the minimum of 8 % of risk weighted assets.

4.2.2. Conservation buffer

In addition to requiring more Tier 1 capital, Basel III introduces a “capital conservation buffer”, which consists of an additional common equity charge that will be required over and above the regulatory minimum described earlier. This conservation buffer will be 2,5 % of risk-weighted assets. This will effectively bring the minimum common equity requirement to 7 % of risk weighted assets and the total Tier 1 requirement to 8.5 %. This buffer will be explicitly available to absorb losses during periods of economic and financial stress.

4.2.3. Countercyclical buffer

Besides the increased Tier 1 capital requirement and the conservation buffer, a separate “countercyclical buffer” is planned to be in effect when there is excess credit growth resulting in a system-wide build-up of risk while still respecting minimum requirements. This countercyclical buffer will “be implemented according to national circumstances.” A range of 0 - 2.5 % of risk weighted assets to be met by common equity of other fully loss absorbing capital is suggested. However, the published Basel III guidelines do not give a time frame for the implementation of the countercyclical buffer.

Table 3: Capital requirements in Basel II and Basel III. Adapted with changes from the Basel committee, 2010.

Capital Requirements in Basel II and Basel III (% of risk-weighted assets)						
	Common Equity Tier 1		Tier 1 Capital		Total Capital	
	Basel II	Basel III	Basel II	Basel III	Basel II	Basel III
Minimum	4,0 %	4,5 %	4,0 %	6,0 %	8,0 %	8,0 %
Conservation buffer	0,0 %	2,5 %	0,0 %	2,5 %	0,0 %	2,5 %
Total	4,0 %	7,0 %	4,0 %	8,5 %	8,0 %	10,5 %
Countercyclical buffer	0,0 %	0-2,5 %	0,00 %	0,0 – 1,0%		
Difference		3 - 5,5 %		4,5 % - 5,5 %		2,5 %

4.2.4. Leverage Ratio

One lesson learned from the financial crisis is that there was a build-up of excessive on-and off balance sheet leverage (and thus, risk) in the banking system, even though banks were able to meet their regulatory risk-weighted assets capital requirements. Even though the United States has always maintained a minimum leverage ratio for its banks, the Basel Committee has resisted adding one to the Basel framework, until now. It is simply gross capital divided by the average total consolidated on-balance sheet assets. A specific leverage ratio has not been agreed to, and it has been left up to each member country to determine one. The supervisory monitoring period began January 1, 2011, and the parallel run, in which both old and new requirements are operating at the same time to determine the differences, will begin January 1, 2013, until January 1, 2015. Based on the results of the parallel-run period, adjustments will be made and the minimum leverage ratio will be determined and applied from January 1, 2018.

In short, the Basel Committee has introduced the leverage ratio for the first time to achieve the following objectives:

- 1) To constrain the build-up of leverage in the banking sector and help to avoid the destabilizing and deleveraging processes which can damage the broader financial system and the economy.

2) To reinforce the risk-based requirements with a simple non-risk-based backstop measure based on gross exposure.

4.2.5. Liquidity Coverage Ratio and Net Stable Funding Ratio

The Liquidity Coverage Ratio is intended to promote resilience to potential liquidity disruptions over a thirty day horizon. It will help ensure that global banks have sufficient unencumbered, high quality liquid assets to offset the net cash outflows it could encounter under an acute short term stress scenario. The specified scenario is built upon circumstances experienced in the global financial crisis that began in 2007 and entails both institution-specific and systemic shocks. The scenario entails a significant stress, albeit not a worst-case scenario, and assumes the following:

- A significant downgrade of the institution's public credit rating
- A partial loss of deposits
- A loss of unsecured wholesale funding
- A significant increase in secured funding haircuts
- Increases in derivative collateral calls and substantial calls on contractual and non-contractual off-balance sheet exposures, including committed credit and liquidity facilities.

The definition of the standard is following:

$$\frac{\text{Stock of high-quality liquid assets}}{\text{Total net cash outflows over the next 30 calendar days}} > 100\%$$

The Net Stable Funding Ratio focuses more on maturity mismatch issues. As such, it attempts to promote more medium and long-term funding of the assets and activities of banking organizations. The metric establishes a minimum acceptable amount of stable funding based on the liquidity characteristics of an institution's assets and activities over a one year horizon. This standard is designed to act as a minimum enforcement mechanism to complement the Liquidity Coverage Ratio and reinforce other supervisory efforts by promoting structural changes in the liquidity risk profiles of institutions away from short-term funding mismatches and toward more stable, longer-term funding of assets and business activities.

The definition is similarly to the liquidity coverage ratio:

$$\frac{\text{Available amount of stable funding}}{\text{Required amount of stable funding}} > 100\%$$

Table 4: The timetable of Basel III implementation. Adapted from the Basel committee Basel III capital rules, 2010: 69.

	2012	2013	2014	2015	2016	2017	2018	2019
Leverage ratio	Supervisory monitoring	Parallel run 2013-2017 Disclosure begins 2015				Migration to Pillar 1		
Minimum Common Equity Ratio		3,5 %	4,0 %	4,5 %	4,5 %	4,5 %	4,5 %	4,5 %
Capital Conservation Buffer					0,625 %	1,25 %	1,875 %	2,50 %
Min. Equity plus conservation		3,5 %	4,0 %	4,5 %	5,125 %	5,75 %	6,375 %	7,00 %
Minimum Tier 1 Capital		4,5 %	5,5 %	6,0 %	6,0 %	6,0 %	6,0 %	6,0 %
Minimum Total Capital		8,0 %	8,0 %	8,0 %	8,0 %	8,0 %	8,0 %	8,0 %
Min. Total Capital plus Cons. buffer		8,0 %	8,0 %	8,0 %	8,625 %	9,250 %	9,875 %	10,5 %
Capital instruments no longer qualify as T 1/2		Phased out over 10 year horizon beginning in 2013						
Liquidity Coverage Ratio	Observation period			Introduce minimum standard				
Net Stable Funding Ratio	Observation period						Introduce min. standard	

4.2.6. Enhanced risk coverage

In addition to redefining eligible capital, increasing the general capital requirements, adding liquidity benchmarks and introducing a leverage ratio, the Basel committee aims to strengthen the risk coverage of the capital framework by additional reforms. Complex on and off balance

sheet derivatives and credit exposures were at the heart of the crisis, and the source of losses for many international banks. As such these reforms will raise the capital requirements for the trading book and complex securitization exposures. The new and tougher treatment introduces a stressed value-at-risk capital requirement based on a continuous 12-month period of significant financial stress. Higher capital requirements have also been introduced for so called resecuritizations in both the banking and the trading book. These reforms have so far tackled issues that fall under Pillar 1 of the Basel framework. Naturally the Basel committee aims to raise the standards of the Pillar 2 supervisory review process and strengthen Pillar 3 disclosures as well.

To achieve its objective of enhanced risk coverage, the Basel committee introduced the following reforms in the Basel III framework:

1) To address concerns about capital charges becoming too low during lower volatility, and to help address procyclicality, banks must determine their capital requirement for counterparty credit risk using stressed inputs.

2) A capital charge for potential mark-to-market losses associated with a deterioration in the credit worthiness of a counterparty. While the Basel II standard covers the risk of a counterparty default, it does not address such risk arising from loss of credit rating, which during the financial crisis was a greater source of losses than those arising from outright defaults.

3) Strengthening of standards for collateral management and initial margining.

4) Support for the efforts of the Committee on Payments and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO) to establish strong standards for financial market infrastructures, including central counterparties, to address the issues of interconnectedness. A bank's collateral and mark-to-market exposures to CCPs meeting these enhanced principles will be subject to a low risk weight, proposed at 2 % and default fund exposures to CCPs will be subject to risk-sensitive capital requirements. These criteria, together with strengthened capital requirements for bilateral OTC derivative exposures, will create strong incentives for banks to move exposures to such CCPs.

5) Raised risk weights on exposures to financial institutions relative to the non-financial corporate sector, as financial exposures are more highly correlated than non-financial ones.

6) Raised counterparty credit risk management standards in several of areas, including for the treatment of so-called wrong-way risk, i.e. cases where the exposure increases when the credit quality of the counterparty deteriorates.

Additionally, the Basel committee has assessed a number of measures to mitigate the reliance on external ratings of the Basel II framework. These measures include requirements for banks to perform their own internal assessments of externally rated securitization exposures and the elimination of certain “cliff effects” associated with credit risk mitigation practices, and the incorporation of key elements of the IOSCO Code of Conduct Fundamentals for Credit Rating Agencies into the Committee’s eligibility criteria for the use of external ratings in the capital framework.

4.3. From Basel II to Basel III

Basel III adds to and modifies the Basel II framework in an extensive and significant manner. Capital requirements are higher while at the same time the available eligible capital is narrowed down to an even tighter definition. Going forward, this will mean that proper capital is more scarce, and thus banks will likely need to make efforts to raise more capital in the form of a share offering or by future retained earnings to meet the Basel III requirements. Many banks have already started this process (as evidenced for example by the evolution of Nordic bank capital ratios, see graph 3 on page 50). The leverage ratio adds to the measures aiming to rein down risk, and to keep off and on balance sheet exposures limited. Naturally, lesser leverage in the future translates to both lower returns and lower risks. Liquidity requirements in the form of liquidity coverage ratio and net stable funding ratio will address the maturity mismatch problems with regards to banks’ liabilities being of a short term nature, while their assets are generally of much longer maturities. Forcing bank funding into longer maturities will make them safer, but at the same time cut straight into the heart of banking’s profitability – sourcing cheaper short term funding and selling more expensive long term products. Requiring them to hold more liquid assets will have the same effect. All of these actions will put bank profitability and rates of return under pressure, and the efforts to make banking more safe seem to turn the industry into a less attractive investment than it has been in the prior years.

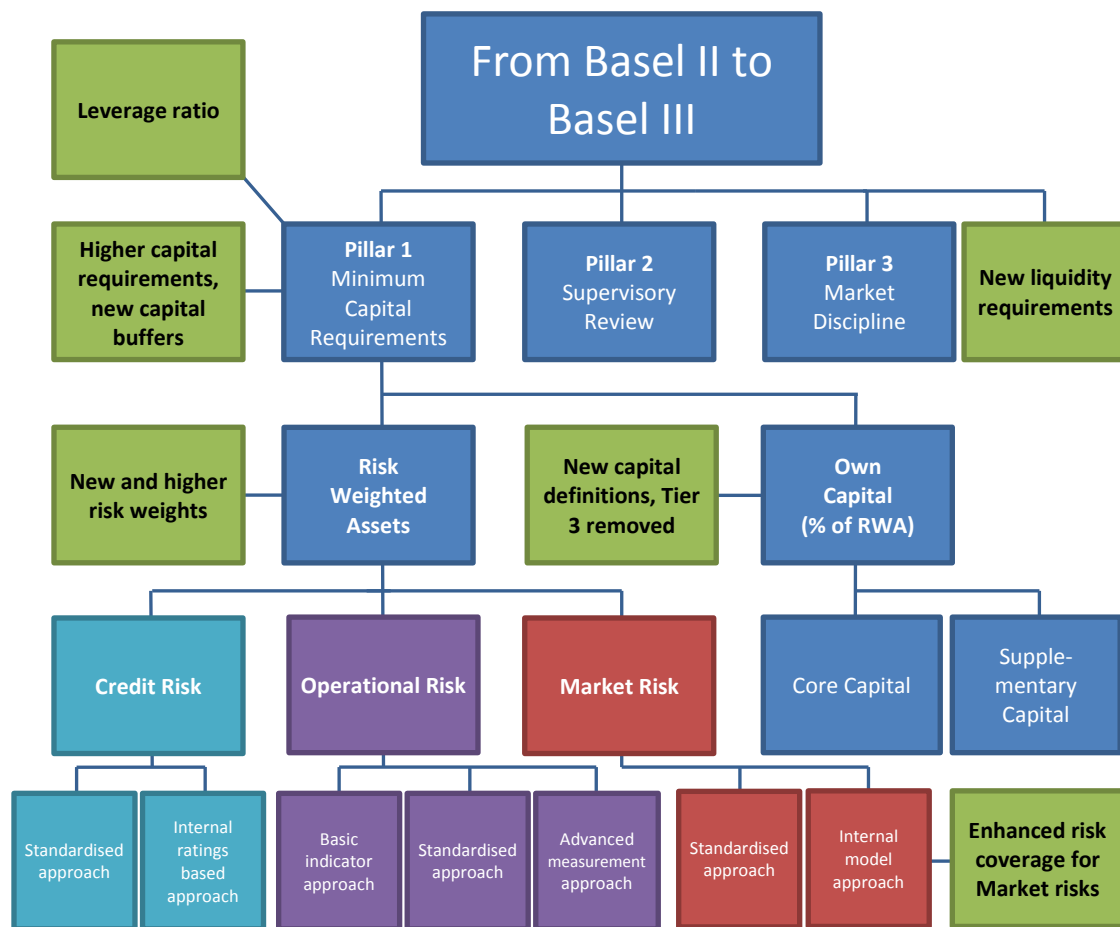
Comparing the new features of Basel III to the general objectives and problematics underlying financial regulation that were covered at the beginning of this study, the new framework appears to address a wider selection of issues than Basel II did before. Rather than focusing on just capital requirements, the wider systemic issues are frequently brought up in the text and

followed up with related regulation such as the leverage ratio, new capital buffers and liquidity requirements.

The leverage ratio will restrict the capital to asset ratio further, and reduce the potential losses by virtue of simply making sure there is more capital related to the risk of losses, as a mirror image of the actual capital requirement. Lower leverage should also mean less potential fire sales and related problems due to lesser likelihood and potential magnitude of deleveraging periods. The new capital buffers help to make sure that there is capital ready to be used to absorb the potential losses, should they arise.

Better liquidity position brought on by adherence to the liquidity regulation will also serve to reduce the likelihood of forced fire sales by making sure there are highly liquid assets that can be sold without high haircuts. At the same time, having more longer maturity funding will also lessen the dangers arising from the maturity mismatch by rolling out liabilities to a longer timescale, matching cash outflows from liabilities to the inflows from assets better than before. By making sure that there is both an ample amount of liquid assets at hand, and that funding needs and liabilities are spread out to a longer timeframe, both the liquidity coverage ratio and the net stable funding ratio help to lessen the threat of funding freezes and fire sales, both of which have significant negative externality effects that were discussed earlier. Matters of capital and liquidity are at the heart of banking.

Graph 2: From Basel II to Basel III. Green boxes represent Basel III additions. Based on Dierick et al, 2005: 10, with additional contributions by the author.



5. CAPITAL AND LIQUIDITY IN BANKING

5.1. The roles of capital and liquidity

Capital and liquidity requirements are going up with Basel III. The industry seems hesitant and suspicious of the benefits of the new regulation, and the fact that capital and leverage must be specifically regulated makes it clear that the banks would rather have less than more capital, should the choice be free. A simplistic explanation would be that since volatility of rates of return is higher when leverage is higher, bank managers will prefer a lower capital ratio as it makes for higher upside (and higher risks) if their only objective is maximizing return on equity. Of course the matter is much more complicated in reality, with multiple often conflicting objectives and incentives influencing the choice of capital ratio and the amount of liquid assets. However, an interesting fact is, that during the past 200 years the percentage of capital held against assets has varied widely, without seemingly affecting the rates of economic growth or the marginal charged by banks, as evidenced by studies on US and UK banks by Kashyap et al (2010) and Miles et al (2011) respectively.

The bank balance sheet is at the basic level similar to what can be found at any other company, with the standard accounting equation $\text{Assets} = \text{Liabilities} + \text{Equity capital}$ holding true. What separates banks from normal companies is the nature of its assets and liabilities. Bank's assets are mostly loans given out, which will be generally paid back over a period of several years. The liabilities on the other hand generally comprised of deposits in the bank, and of short-term funding from other financial institutions. Deposits can be withdrawn generally at any time. The short term nature of liabilities and related cash outflows versus the cash inflows from assets spread out to longer time frame is the basis for the maturity mismatch. As per the established accounting equation, $\text{Assets} = \text{Liabilities} + \text{Equity capital}$, a decrease in assets would have to be met with a similar decrease on the other side of the equation. Deposits and debt to other institutions cannot be readily written down or cancelled, and thus the responsibility of taking the write down from losses on assets falls to the equity capital part of the balance sheet. As bank leverage has increased (see Miller 2011 and Kashyap 2010) and the relative amount of equity capital has decreased, the result has been a significantly increased vulnerability of bank capital towards asset write downs. This phenomenon has been aptly demonstrated by the events of the past 5 years. Equity capital is the risk and loss absorber of the bank balance sheet.

Just as any other company, a bank needs cash to meet its payment obligations towards its clients and counterparties in the financial markets. Banks generally obtain this essential cash funding through short term funding agreements with other financial institutions. During the financial crisis, these short term funding markets froze as market participants lost trust in each other and their ability to pay back these short term loans, and the provisioning of funding was severely cut. This lack of available liquidity resulted in asset fire sales and severe financial distress as otherwise healthy institutions scrambled to raise money to fund their daily operations. Proper liquid assets have a highly functional market at any time and can always be sold at a good price. A considerable pool of liquid assets that can be traded for cash at any time to meet cash outflows is the gas that keeps the financial institution vehicle running. As Tirole (2010: 1) notes, illiquidity and all its friends (market freezes, fire sales, contagion) lead to insolvencies and bailouts. Thus, proper liquidity position is essential for the smooth functioning of a bank, and an adequate equity capital cushion keeps a bank in the game when going happens to get otherwise rough.

5.2. The determinants of capital structure

Modern research on capital structure originates with Modigliani and Miller (1958) and their seminal work, which presented the idea that in an idealized frictionless world with complete markets and information, the capital structure decision should not matter. Higher leverage will lead to higher costs of equity as required return increases with additional risk. This effect coupled with debt interest rates responding to firm risk lead to a situation where firm value and cost of financing are independent of leverage according to Modigliani & Miller theorem. Following this line of thought, leverage and capital ratios should be randomly distributed across different industries. This is not what has been observed in the real world, with banking and financial industry among the highest levered segments of the economy, clearly distinguishing itself from other industries as shown by Herring (2011: 173).

There are several factors that influence the relative price of debt and equity, and a firm's decision between capital and debt funding, which invalidate Modigliani and Miller's idealized model. Berger et al (1995) and Herring (2011) present the most common real world issues that give rise to deviations from the Modigliani & Miller model situation, which are described in the following paragraphs.

Taxes and financial distress are the first frictions to the idealized model. The tax deductibility of interest payments that is common around the world makes debt preferable to equity.

Ceteris paribus, the fact that interest payments are tax deductible and dividends are not, means that a company with more debt will enjoy greater returns than one with higher proportion of equity. The expected costs of financial distress vary with the level of capital; higher capital ratio means lower probability of default in case of distress, and as a result, the riskiness of the firm is lower as is the required return on capital. Less risk leads also to lower interest rate payments. This means that higher capital ratio has a positive effect of lowering interest and expected distress costs. The dynamic between tax deductibility of debt and increased expected costs of financial distress with lower capital work in opposite directions with regards to company value; more tax deductible debt may mean higher profits but at the same time it will make a company more suspect to a bankruptcy, in other words, more risky. Likelihood of financial distress also tends to have additional costs such as increased demands from suppliers, employees leaving or demanding higher pay and so on.

Asymmetric information and transaction costs are the second friction mentioned by Berger et al (1995) and Herring (2011). Essentially, the banks' internal information about loan customers and their own economic prospects may differ from what is known or perceived by the rest of the economy. As such, when bank managers have better outlook about their own prospects than the market, they might be reluctant to issue equity as it would be sold at a discount from the manager's perspective. A contrary situation would be an incentive to issue equity as it would sell with a premium, as the market overvalues the bank's prospects. In addition, banks may be inclined to use capital ratios as a signaling method, where capital decision may be used to signal high quality or expected future performance. Transaction costs for issuing equity are generally higher than for issuing debt, which may also act as a factor influencing the capital structure decision.

Agency costs arising from conflicts of interest between shareholders, managers and creditors are also a potential source of preference for either debt or equity, and a significant driver in the capital structure decision. For example circumstances near bankruptcy may cause shareholders to endorse excessively risky behavior, or in other hand refuse to fund even value increasing investments due to overt risk-aversion.

The safety net. While the prior reasons affecting capital structure are common for every firm, banks are in a unique situation due to the protection of government guarantees and safety net that are common features of the financial systems in most countries. These safety net measures include all the measures taken by government to enhance the safety of the banking system, outside capital requirement regulation. Measures such as deposit insurance, payment guarantees and central bank support act to shield banks from market discipline and move

potential costs of failure to the state and out of the banks themselves. These distortions reduce the need to hold loss absorbing capital. Herring (2011: 176) shows that bank leverage has increased greatly and steadily over the past 200 years, while at the same time the bank safety net measures have evolved to cover more and more risks.

As shown by Berger et al, and Herring, there are several frictions that affect firm choices about whether to fund assets with equity or debt. Gropp and Heider (2009) provide color to the findings of Berger and company, and Herring by showing that profitable and dividend paying banks with higher market value to book value tend to issue more equity. Capital structure may also be driven by the risk appetite of the management, or by the customer determined structure of the assets. They view the bank balance sheet structure as driven by market forces, with regulatory capital requirements becoming significant determinant of the capital structure decision only when a bank's capital comes close to the regulatory minimum.

Different industries have markedly different types of capital structures which derive from their unique situations and incentive structures. In general it is reasonable to assume that firm balance sheet structures are a result of the management's efforts to maximize shareholder wealth under the unique circumstances prevailing within a company and within their respective industries, as shown for example by Calomiris and Wilson (2004), Ashcraft (2008) and Flannery and Rangan (2008).

5.3. Market based versus regulatory capital requirements

Berger et al (1995) define the optimal capital ratio required by the market, or the market capital requirement, as the capital ratio that maximizes the value of the bank in the absence of regulatory capital requirements, but with taking into account the safety net and other regulatory structures protecting the bank. This means that a market based optimal capital ratio would be flexible and different for each bank as fits their unique situation, and generally determined by the frictions described above that affect the capital structure decision. On the other hand regulatory capital requirements by the regulator and the state providing the safety net arise from two motives: first, the same motive that uninsured creditors have for requiring capital – to protect themselves from potential financial losses; second, they are driven by the desire to protect the wider economy from negative externalities and systemic risks in the financial market.

The regulatory capital requirements are not without unintended and negative consequences. If the regulatory capital requirement is higher than the market based capital requirement, the excess capital demanded by regulation will lead to reduced value of a bank, and increases its average cost of financing. This will effectively create a social cost as higher regulatory capital costs will be passed on to customers. In effect there is a tradeoff between the social costs of too high capital requirements associated with higher costs of financial intermediation, and the benefits of decreased probabilities and social costs associated with bank failures, financial crises and related negative externalities. If the original Modigliani & Miller theorem would apply about the neutrality of balance sheet structure, then increasing the capital requirement to a level at which the probability of default is practically zero would be a costless solution. Due to the frictions presented earlier, this does unfortunately not apply (Berger et al: 1995).

The regulatory capital requirements also tend to incentivize securitization and off balance sheet activities. The reason is simple: moving assets off books will enable banks to game the risk weighted assets related to capital requirements into their advantage. Historically this phenomenon has increased greatly since the 1980's which coincided with the first Basel guidelines. This simple reasoning was however challenged relatively early on by Jagtiani et al (1995), who do not find consistent effect of regulation on the adoption of off balance sheet products. They explain the increase in off balance sheet products by technological changes, learning factors and increases in overall economic activity. In addition to off balance sheet activities, Berger et al (1995) report that the new capital requirements have caused balance sheet optimization in terms of asset choices, that may have resulted in reduced lending and increased holdings of instruments with lesser risk weights, such as government debt instead of commercial and industrial loans. It seems unlikely that the trend observed already during the 1990s has lost momentum since.

5.4. Costs and benefits of additional capital

The dilemma with increasing capital requirements is simple: increasing equity capital will inevitably lead to costs for the individual banks in the form of either equity issuance or by retained earnings, and as a result of the frictions to the Modigliani & Miller model. These costs of higher equity capital may also be passed on to the bank customers, resulting in higher cost of financial intermediation. The benefit of these actions is the lessened risk of default and distress within the banking system, and as a result, lesser social costs related to these events. While lesser risk may lower financing costs for the individual bank, the main benefit is not for

the private bank entity bearing the costs, but for the general public and the financial system as a whole, which will in addition to the lesser risk of the default by the individual firm enjoy the lesser likelihood of negative externalities and systemic problems arising from that potential default. Thus the main costs of increasing capital requirements are private, but the benefits are social and not internalized by the private decision maker. And as a result, capital ratios may be too low from the societal point of view. The crisis of 2007-? certainly lends a hand to this argument. In order for increasing capital requirements to be meaningful, their social benefits must outweigh the costs borne by the banks under the regulation. In this chapter the study will map the costs and benefits of increasing capital ratios.

The actual short term costs of raising new equity capital are relatively simple to determine, and over the long term rather small and therefore likely irrelevant with respect to the capital structure decision, and with regards to lending behavior and output in general. In reality, raising new equity can however be troublesome in a situation where the market is stressed and general risk aversion is high, resulting in an unwillingness to invest and potentially depressed valuation due to lack of demand and generally overly negative outlook. In other words, the market environment may often be simply unfavorable for equity issuance. The costs of raising equity come from professional fees, underwriting fees, corporate governance and regulatory fees, listing fees etc., all of which taken together can be significant portion of the raised capital. It bears to keep in mind that most major banks have investment banking divisions that are capable of organizing the issuance internally, which can significantly reduce these costs.

The longer term costs and benefits of increasing equity in bank balance sheets come from various avenues, which generally depend on the frictions related to the Modigliani & Miller theory on capital structure. Miles et al (2011: 3-4) mention that estimating the costs and benefits of regulation will require consideration of a range of issues, such as the effects on rates of return, tax effects, the difference between costs to individual institutions and to the society at large. The major factors in cost-benefit-analysis are: 1) The extent to which the required return on debt and equity change 2) the dynamic between changes in average cost of funding, tax treatment of debt and equity, and the impact on government tax revenues 3) The extent of decrease in banking problems as a result of increased equity buffers 4) The scale of economic costs arising from the banking sector problems.

5.4.1. The costs of higher capital requirements and liquidity regulation

Several studies approach the issue of costs of higher capital requirements, providing a multitude of views and estimates about the impacts, which are generally thought to be reflected in the cost of capital and lending activity. Cost of capital and lending activities in turn have an effect on economic output. Kashyap et al (2010) aim to model the long-run steady state impact of an increase in capital requirements taking into account the effects of the displacement of the tax shield (corporate tax rate assumed at 35%) benefit from substitution of debt for equity. Depending on the type of debt substituted by equity, Kashyap et al estimate that on one end a 2 percentage point increase in required equity to asset ratio will lead to 5 – 9 basis point (0,05 – 0,09 percentage points) increase in Weighted Average Cost of Capital, while on the other end a 10 percentage point increase in equity capital requirement would translate to increased cost of capital by 25 to 45 basis points, giving an overall range of 5 – 45 basis points between all scenarios. This study does not take into account the costs arising from the act of raising the new equity capital, or any other costs, and focuses simply on the effects of debt substitution with equity. This increase in costs of capital is believed to be reflected directly to customer lending, in effect raising interest rates of the loan products offered.

The Basel Committee itself has also delved into the issue in its 2010 ‘Assessment of the Long Term Economic Impact of Stronger Capital and Liquidity Standards’, taking into account the increasing costs of lending and the loss of output arising from both higher equity capital requirement and the new liquidity regulation. The committee estimates that a 1 percentage point increase in capital requirements will lead to a 13 basis point increase in lending spreads. This translates to a similar increase in the cost of capital, as the model in the study is based on a steady 15% Return on Equity assumption. Assuming risk weighted assets stay unchanged, the cost to meet the Net Stable Funding Ratio is estimated to be between 23 and 25 basis points. To provide some points of comparison to its analysis, the committee estimates that the costs arising from a 1 percentage point increase in the capital ratio would correspond to a 1,9 percentage point decrease in median ROE or may be offset by reducing operating expenses by 3,5%.

To map the potential long term loss of output arising from increasing equity capital and liquidity requirements, the Basel committee uses an array of 13 different models. Changes in capital and liquidity requirements have a negative impact on economic activity by increasing the cost of financial intermediation. The models applied give an average of 0,51% output loss for 2% increase in equity capital requirement and the implementation of liquidity regulation.

For 4% and 6% increases in capital requirements the lost output is on average 0,72% and 0,92%. The minimum to maximum range for estimated output losses for 2% and 6% requirement hikes 0.07 % to 2.05 %. The models generally assume a period of 32 quarters, over which the losses in output are predicted.

Elliott (2009) constructs a model on loan pricing as a measure to study the the interactions of the various components of the loan cost and the effects of increasing proportion of equity backing the loan. He estimates that increasing the equity proportion backing the loan from 6% to 10% would require USD 300 million worth of new equity for the US banking system, which would mean a 20% increase to the existing USD 1,4 trillion of equity. If adjustment to the 4% higher capital requirement for the loan is made through loan interest rates, Elliot estimates a hike of 77 basis points, assuming banks want to hold a ROE rate of 15%. A more balanced case where banks adjust to the higher capital requirement through multiple channels such as ROE requirement, return on debt, credit spread and so on, the increase in loan rate charged from the customers would be only 20 basis points.

A UK based study by Barrell et al (2009) focuses on the effects of increases in regulatory capital and liquidity on output. They find that in the long run 1 percent increase in regulatory capital and liquidity requirements raises the cost of capital by 0,85 percent, and in turn reduces the UK output by 0,12 percent. In addition, they note that 1 percentage point tightening of capital and liquidity standards will lead to 1,2% contraction on overall bank balance sheets, with risk weighted assets falling 1,6%. Schanz et al (2011) estimate the costs of raising the capital ratio by 1 percent by substituting debt with equity capital at GBP 1,7 billion for the UK banking sector, which could be recouped from lending to non-bank customers with a rate increase of 7.4 basis points.

Francis and Osborne (2009) investigate the dynamics of regulatory capital requirements, banks' internal capital targets and lending growth within the UK banking system. The expansion or contraction of the credit supply potentially affects output, as evidenced by several studies referred, and Francis and Osborne suggest that growth or decline of the credit supply is related to the excess or lack of capital which is dependent on both regulatory capital requirements and the internal capital targets by the banks themselves, which are generally above the regulatory minimum. They find that 1 percent surplus of capital relative to the banks' internal capital targets is associated with higher growth rates in lending (0,05%) and total assets (0,06%). Additionally, a capital level above the internal target also translates to lower growth in regulatory capital. The relationships are opposite when there is a capital deficit instead of a surplus. Francis and Osborne also studied the effects of a simulated 1

percentage point increase in capital requirements in the UK in 2002, estimating after four years the stock of lending to be 1,2% lower and risk-weighted assets 2,4% lower than the baseline scenario would have suggested. A series of 1 point increases in capital requirements in 1997, 2000 and 2003 would have decreased asset growth by 4,2%, risk weighted asset growth by 7% and loan growth by 3,5% by 2007, according to their simulation.

In a complementary manner to Francis and Osborne, a study by Berrospide and Edge (2010) explore the relationship of capital ratios and loan growth during the financial crisis in the US, during which the troubled banks were actively supported and recapitalized by the state. Through a variety of methods they show that additional capital yields modest but measurable growth in loan volumes. In the context of a study about Basel III capital requirements, raising official regulatory capital requirements is seen to decrease the excess capital, and thus act as a negative factor for loan growth; increase in actual capital base is a positive factor. An important finding by Berrospide and Edge is the fact that during the early years of the financial crisis, banks and bank holding companies in the US apparently gave relatively little consideration to their capital position vis a vis lending. Instead, loan demand and risk were important factors. They also question whether existing measures and definitions of bank capital are sufficient to determine bank behavior, and pose a question on the relevance of the current capital regulation.

There seems to be considerable evidence that points towards a clear cost for increasing regulatory equity capital and liquidity requirements. Besides short term cost of equity issuance or retained earnings, higher equity capital requirements seem to constrain financial intermediation, or lending growth, either by increasing cost of capital and interest charged, or by discouraging additional lending. Both results have the effect of slowing down economic growth, as credit is more expensive and less available. These effects amount up to percentage points of GDP, which is clearly a material cost. The relationship between credit supply and output has been established in several studies over recent decades, and factors such as monetary policy, have a direct impact on both (see for example Ciccarelli et al: 2010 and Aiyar 2011). The studies concerning the effects of tightening capital requirements are more recent, but the evidence points towards the fact that adjustment to higher capital requirement will come at a cost to lending, and therefore, to output.

There is however also evidence that banks are able to mitigate the effects of higher capital requirements through multiple channels of adjustment, as shown earlier by Elliot (2009), and for example by Memmel and Raupach (2007), who give a German perspective on how banks adjust their capital ratios. They find that there seems to exist an internal capital target for the

majority of German banks, and that the banks with more liquid assets follow their targets more tightly, and secondly that banks with lower target capital ratios compensate with lower risk assets. And as mentioned above, Berrospide and Edge (2010) provide reasons to believe that there are several other important factors, such as risk, loan demand and general lending standards, which affect bank lending behavior in addition to capital position.

It must be noted that these studies are at the very general level, and may not accurately reflect the costs for different types of banks, or the variety of banking products that are facing changing regulation and capital requirements. A good example is trade finance which is broadly used in export/import businesses, and is at the moment about to be subjected to a 5x increase in capital requirements with Basel III, based on new and tighter asset risk weights. This increase in capital requirements for international trade financing may have severe consequences for both international trade flows, and to the banks whose major source of revenue this business is, in a manner that is not captured by simple and broad estimates about rising cost of capital. In the end it is obvious that in order to be justified, if higher capital requirements have clear and material costs then the benefits of regulation should be high enough to offset them.

5.4.2. The benefits of higher capital requirements and liquidity regulation

The benefit of higher equity capital on bank balance sheets is simply the lesser cost, or lost production in terms of GDP, resulting from less frequent and less severe financial crises. According to the Basel committee study 'Assessment of the Long Term Economic Impact of Stronger Capital and Liquidity Standards' (2010: 8), averaging across countries and time, banking crises occur every 20-25 years. The latest financial crisis makes it clear that the costs of such crises can be enormous and destabilizing for the whole world economy. At the worst end, countries such as Latvia have suffered cumulative GDP losses in the magnitude of -24% from 2007 peak to the bottom in 2009. It is of course difficult if not impossible to establish whether regulation could have helped and what is the exact proportion of the damage that was a result of the misadventures of the financial sector. Without delving into the myriad reasons and causes for the financial crisis, it is clear that it hurt, hard, and across the globe, and that trying to prevent another one seems like the responsible move.

As the party responsible for global financial regulation, the Basel committee has put together a literature summary about estimates of the costs of financial crises in the assessment mentioned in the above paragraph. The median drop in output from peak to trough across

time and countries has been between -9 to 10% of GDP. A common feature has also been a permanent steady state drop in the level of GDP, which means that the initial loss of output was not “caught up” with a corresponding above trend growth after the crisis. In other words, the GDP growth path dropped to a lower level, even if the growth rate remained at historical levels post crisis. In a scenario where the output finally does catch up to the prior growth path, cumulative discounted losses are estimated at 19% of GDP, which is a composite of the lost output until the prior growth path is caught up with. When there is a permanent steady state loss of output, the earlier growth path is never attained. The median cumulative loss of output calculated from this lower permanent level of output is 158% of GDP at pre-crisis level. The median cumulative effect across all studies used by the Basel committee is 63% of pre-crisis GDP. In general, it seems that the negative effects of financial crises are long-lasting and more intense than those from “regular” recessions. This is due to a variety of factors: loss of confidence, increased risk aversion, disruptions in financial intermediation etc. (the Basel committee: 2010).

The Basel committee study also lays out the estimated benefits rising from 1,2 and 3 percentage point reduction in the probability of crises multiplied by the costs estimated above (19-158% of GDP). When crises have no permanent effects (ie. a cost of 19% of GDP), a 1 percent reduction in the probability of crises generates a benefit of about 0,2% on the yearly level of GDP. On the other end, if crises have a small permanent output effect (63% of GDP), the benefit is 0,6% of GDP per year, and finally if the crises have a large permanent effect (158%), the benefit is 1,6% of GDP per year. These estimates are simply the change in likelihood of crisis multiplied by the cost of crisis. No attention is paid to the actual source of lesser likelihood of the crisis (the Basel committee: 2010).

Naturally, as a result of Basel III capital requirements and liquidity standards, the Basel committee assessment also takes up the task of estimating the beneficial effects of higher capital and liquidity standards on probabilities of financial crises. The assessment applies several different methods to reach the target of estimation. All methods estimate a significant reduction in the likelihood of a banking crisis as a result of higher levels of capitalization and liquidity regulation. The models also estimate that the marginal benefits of additional capital are rather sharply diminishing. The probabilities of crisis corresponding to different levels of capital and to liquidity requirements are presented in the following table.

Table 5: Capital and liquidity requirements and the estimated likelihood of a systemic banking crisis (in percent) by the Basel committee. Adapted from the Assessment of the Long Term Economic Impact of Stronger Capital and Liquidity Standards (2010: 15).

Tangible Common Equity / RWA	All Models	Models not assessing changes in liquid assets	Models incorporating 12,5% increase in liquid assets over total assets	Models incorporating 50 % increase in liquid assets over total assets
7 %	4,6 %	5,1 %	3,3 %	1,8 %
8 %	3,0 %	3,1 %	2,3 %	1,2 %
9 %	1,9 %	1,9 %	1,6 %	0,9 %
10 %	1,4 %	1,3 %	1,2 %	0,7 %
11 %	1,0 %	0,9 %	0,9 %	0,5 %
12 %	0,7 %	0,6 %	0,7 %	0,4 %
13 %	0,5 %	0,5 %	0,5 %	0,3 %
14 %	0,4 %	0,4 %	0,4 %	0,2 %
15 %	0,3 %	0,3 %	0,3 %	0,2 %

Not surprisingly, according to the Basel committee model estimations, increasing capital and liquidity requirements is predicted to result in significant reduction in the likelihood of a systemic banking crisis.

The Committee has also attempted to quantify the expected long-run annual costs and benefits of higher capital ratios and liquidity requirements in terms of percentage impact on the level of output per year. The results of these estimations are presented in table 6, adapted from Assessment of the Long Term Economic Impact of Stronger Capital and Liquidity Standards (2010: 29). The estimation for net benefit uses pre-reform steady state with 7% capital ratio, and the average probability of banking crises (1 every 20-25 years, or about 4,6% likelihood in a given year). Net benefits are a discounted result of costs and benefits. The table presents three different crisis scenarios which correspond to 19%, 63% and 158% of pre-reform GDP costs for financial crises.

Table 6: Expected costs and benefits of higher regulatory standards in terms of annual output per year. Adapted from the Basel committee Assessment of the Long Term Economic Impact of Stronger Capital and Liquidity Standards, 2010.

Tangible Common Equity / RWA	Expected Costs	Net Benefits (low crisis costs)	Net Benefits (intermediate crisis costs)	Net Benefits (high crisis costs)
Liquidity Requirement Not Met				
7 %	0,00 %	0,00 %	0,00 %	0,00 %
8 %	0,09 %	0,20 %	0,87 %	2,32 %
9 %	0,18 %	0,31 %	1,44 %	3,87 %
10 %	0,27 %	0,33 %	1,71 %	4,70 %
11 %	0,36 %	0,31 %	1,87 %	5,23 %
12 %	0,45 %	0,27 %	1,94 %	5,54 %
13 %	0,54 %	0,21 %	1,96 %	5,73 %
14 %	0,63 %	0,15 %	1,95 %	5,84 %
15 %	0,72 %	0,08 %	1,92 %	5,90 %
Liquidity Requirement Met				
7 %	0,08 %	0,15 %	0,68 %	1,83 %
8 %	0,17 %	0,25 %	1,23 %	3,33 %
9 %	0,26 %	0,29 %	1,56 %	4,30 %
10 %	0,35 %	0,28 %	1,75 %	4,91 %
11 %	0,44 %	0,25 %	1,85 %	5,30 %
12 %	0,53 %	0,20 %	1,89 %	5,55 %
13 %	0,62 %	0,14 %	1,90 %	5,70 %
14 %	0,71 %	0,07 %	1,89 %	5,80 %
15 %	0,80 %	0,00 %	1,85 %	5,85 %

Again, not surprisingly, the Basel committee estimates significant benefits in increasing capital and liquidity standards. The Committee admits that estimating the reduction in probability of crises and their costs is fraught with uncertainty, and in addition provide reasoning and explanations as to why the estimated benefits may be higher or lower than presented. Factors creating additional benefits are for example: reduction in the amplitude of business cycles, the fact that expected costs in terms of lost output are based on historical data which do not however include the public expenditure used to counter previous crises (thus estimated costs are understated), the assumption that higher cost of capital will pass through 100% to loan rates (could be less), and the extent to which financial intermediation is provided by non-bank sector (can be a significant amount). Similarly, there are multiple factors which may also reduce net benefits, for example: possible overestimation of the costs of crises due to various reasons, overestimation of the effectiveness of capital and liquidity requirements in reducing

probabilities of crisis, shifting of risk to non-regulated sector, etc. The committee stresses that the estimated numbers are based on data gathered from a large variety of countries over a long period of time; there is bound to be uncertainty and variation between real world performance and what is estimated.

In addition to the efforts and results summarized and estimated by the Basel committee assessment, Barrell et al (2009: 42) also find net benefits from increasing regulatory capital and liquidity standards. A 1 percentage point increase would lead to just over 4% cumulative gain as a proportion of GDP, with positive effects peaking at 3 percentage point increase of capital and liquidity standards, with 7% gain in long run UK GDP. A 7 percent point increase in capital and liquidity would finally bring the cumulative net effect on GDP into negative territory.

The other UK based study by Schanz et al (2011) also makes some rough estimates with clear net benefits in increasing capital ratios. In a similar manner to the earlier Basel committee studies, they assume a mean cost of a crisis as 140% of GDP as a result of lost output and a perpetually lower growth path. They note that an increase in capital requirements will reduce the lost output from all potential future crises, and estimate net benefits for increasing capital requirements up to a level of 11% of risk weighted assets at the worst case scenario. According to them, even 14% capital level could still have a positive net effect on GDP.

5.4.3. Summary of estimated costs and benefits

Taking the aggregated results of Barrell et al, Schanz and company and those presented by the Basel committee, it seems obvious that based on the estimations the net effect of increasing capital and liquidity regulation is beneficial as a whole.

The costs of financial regulation come in through increased costs of capital as result of lost tax benefits and an increased cost of financial intermediation, which is a reflection of the increased cost of capital that has been passed through to lending rates. The increase in lending rates in turn affects the cost of debt for the rest of the economy, lowering the amount of financial intermediation in the economic system and output in general. The estimations of the cost of financial regulation covered by this study come in two forms, either focusing on the increasing cost of capital/lending, or directly on the output lost. A summary of the results of the estimations follows.

Cost of regulation in terms of increased cost of capital or loan rates

1-2 per cent increase in capital requirements: 5-38 basis points.

Liquidity rules: 23-25 basis points.

Cost of regulation in terms of lost output

1-2 percent increase in capital requirements: 0,07% - 1,02% reduction on yearly GDP level.

Liquidity rules: 0,08% of GDP/year.

The benefits of regulation arise from the lesser likelihood and severity of potential future crises that are assumed to result from higher capital and liquidity requirements. Thus the estimations of the beneficial effects are based on the prior crisis costs and frequencies and corresponding relative capital ratios and liquidity levels. A summary of the results of the net benefits follows.

Net benefit of regulation in terms of increased/saved GDP

1-2 percent increase in capital requirements: 0,2%-4% increase in yearly GDP level

Liquidity rules: with no adjustment to capital ratios 0,15%-1,83% GDP/year, otherwise effects diminishing at higher capital ratios and benefits depend highly on crisis cost estimates.

Considering that the studies covered posit a net benefit for increasing capital and liquidity requirements, it seems strange that the issue seems to be so contested. As discussed in earlier parts of the study, the bank capital decision depends on multiple factors such as debt tax treatments and public safety nets – the frictions to Modigliani & Miller theorem – and on the differences between market and regulatory capital requirements. The estimations on costs and benefits of higher capital and liquidity requirements take a societal, complete view on the issue. The management of a bank generally has the interests of the bank and its shareholders in mind, which creates a set of capital structure preferences that is different from the social ideal. Should the capital decision be made by the society (i.e. the regulator) or by the bank itself? Thus we arrive at the question: what would be the optimal amount of bank capital?

5.5. Optimal bank capital

The fact that Basel committee estimates a banking system with an average of 7% tangible equity capital to risk-weighted assets (apparently the norm before the crisis/Basel III implementation) to have 4,6% chance of a systemic banking crisis in a given year (see table 5) is alarming to say the least. Of course it may be that the relationship between bank capital and crises hasn't attracted enough academic attention before the last decade, and that the relationship found with the Basel committee's aggregation of studies came as a surprise to everyone. It is also evident that practically no-one really did imagine or expect another crisis in the magnitude of the Great Depression of the 1930s. Nonetheless based on the research covered here it seems that the net benefits of higher capital and liquidity requirements are considerable and the risks rising from low capital levels high, and therefore capital and liquidity requirements should go up. And with Basel III they are. But the question remains, what is the correct level of capital, and does such a level even exist within the regulatory reach.

The Basel committee estimations, as presented in table 6 on page 46, on the net benefits of higher capital and liquidity requirements peak at 9% tangible common equity to risk weighted assets ratio with low costs of financial crises, 13% with moderate costs, and at 15% with high costs of financial crises. It must also be noted that net benefits for higher capital requirements continue to exist in the moderate scenario all the way up to 15% capital ratio, and with low crisis costs the net costs/benefits are estimated at 0% at 15% ratio respectively. If one wants to consider every crisis cost scenario equally likely, then the optimal capital may be considered as an average of the ideal ratios for each scenario. This number would be $(1/3 * 9 + 1/3 * 13 + 1/3 * 15) = 12\%$ common tangible equity to risk weighted assets. Contrasting this 12% capital ratio with the likelihood of systemic banking crises as estimated by the Basel committee, should the capital ratios be at 12% universally, this would correspond to 0,4–0,7% yearly likelihood of financial crises, which is considerably lower than the 4,6% with 7% capital and no liquidity requirements, which represents the pre-crisis/Basel III regime.

Compared to the Basel committee, Miles et al (2011) suggest significantly higher capital levels. They estimate that a capital ratio that would halve leverage would result in an increase of cost of capital and financial intermediation that would result in a 6% drop in the present value of discounted future output. If this seems high, the net benefits are estimated to be even greater. They find net benefits for very high levels of capital, depending on the scenario, even up to levels of approx. 47% of risk-weighted assets. The final estimate is that an optimal capital ratio

may be around 20% of risk-weighted assets. One must take note, that Miles et al do not consider the effects of liquidity in any way.

Barrell et al (2009) add their UK based results to the studies suggesting higher capital and liquidity requirements. They too note costs for higher capital and liquidity standards, but they too find that there are net benefits in raising the requirements upwards, with a range of 2-6% raise in capital and liquidity ratios resulting in higher welfare. The benefits peak at a 3% raise which, considering the UK pre-crisis average capital ratio of 11% at Q1/2007, would mean “optimal” capital to risk-weighted assets ratio of around 14% of risk-weighted assets, with a beneficial range of 13-17%. Schanz et al (2011) on their part found significant net benefits for capital ratios between the range of 10 to 15% of risk weighted assets. The net benefits are marginally decreasing, being lowest at the highest capital ratio of 15%. The probability of systemic crises decreases sharply until 12% capital ratio, above which it is considered a sub 1% possibility each year.

As always, reality is more complex than what a few econometric models might make one think. Gambacorta and Mistrulli (2004) present Italy-based evidence for positive effects of higher capital ratios with regards to resistance to negative monetary policy shocks and to pro-cyclicality of credit supply. More highly capitalized banks are able to weather negative policy and business environments without much effect to their supply of credit to public; credit supply of the riskier banks is on the other hand more volatile. Webber and Willison (2011) pay attention to the pro-cyclicality of capital requirements themselves, and suggest that capital requirements should be increasing with balance sheet size and the value of the bank’s interbank obligations. Finally, Perotti et al (2011) show that traditional capital regulation may become less effective at higher capital levels, as higher capital ratios may enable banks to take too high risks with too mild negative outcome projections.

To sum up, the message from the studies covered seems to be in general favorable towards higher capital and liquidity ratios for banks, with the benefits clearly outweighing the higher costs of financial intermediation. It must also be kept in mind that the costs of higher capital requirements are more obvious and likely easier to quantify. The benefits of averted future financial crises are on the other hand much more difficult to accurately predict and measure (as future in general tends to be). The key issue here is whether higher capital and liquidity ratios actually achieve their targets of lowering the probabilities of systemic banking crises. Despite varying levels of capital, financial crises have plagued the world in a persistent manner for centuries. But it is reasonable to assume that higher capital and better liquidity positions

will help banks to navigate the turbulent waters of the economic system in a more safe and secure manner.

The estimates for “optimal” bank capital range from 10% to 20% of risk-weighted assets. A weighted average from the Basel committee’s own analysis of capital ratios and their peak net benefits yields a tangible common equity to risk-weighted assets ratio of 12%, which is, interestingly enough, considerably higher than what is required by the Basel III regulation. Based on Basel III capital requirements it seems that the committee is optimizing the capital ratio (7% common equity, 8,5% tier 1 capital, 10,5% overall capital) to correspond most closely to the low crisis cost scenario, which had optimal tangible common equity ratio of 9%. This seems like a very optimistic view of potential future crisis costs. All in all, these optimal bank capital ratio estimations might find the most common ground at a level around 12-14% of risk weighted assets.

In principle the optimal capital recommendations are based on a wider societal perspective, taking into account the effects of capital regulation to the whole economy. Thus they incorporate the social benefits of decreased costs from potential financial crises – something that does not sufficiently enter the capital structure calculations of individual bank managers, who optimize their company’s profitability and share value without regard to potential negative externalities. It seems likely, that the market capital requirement (a capital ratio that maximizes enterprise value) is determined in a similar fashion. Thus there exists a potential difference between higher “social/regulatory” and lower market based capital requirements. Based on rather low Basel III capital requirements compared to the optimal capital ratios covered in previous paragraphs, the Basel committee may be perceived as trusting the market to guide banks towards correct capital ratios, despite several studies advocating higher capital ratios, with considerable estimated net benefits in terms of GDP saved as a result of avoided future financial crises.

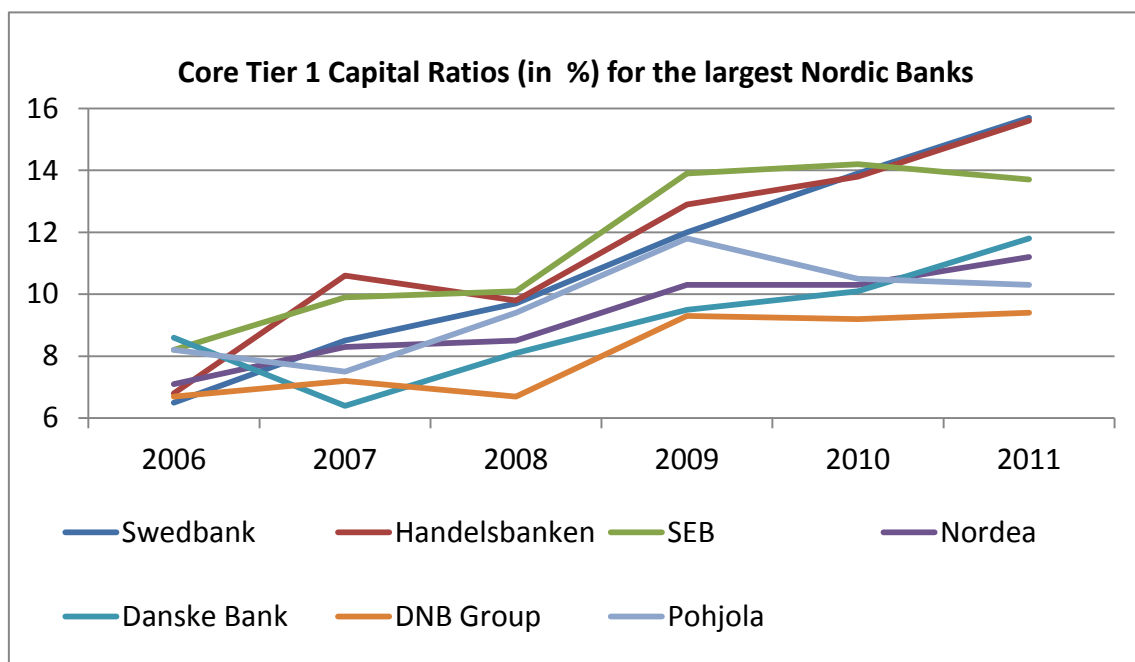
Based on the presented estimations on the effects of higher capital requirements on financial stability and on financial intermediation, the study will next turn to the Nordic countries, and estimate how Basel III can be expected to affect the financial systems of the northern European states.

6. MAPPING THE EFFECTS OF BASEL III TO STABILITY, OUTPUT AND LENDING IN THE NORDICS

6.1. The Evolution of capital ratios and stability in the Nordics 2006-2011

With the 6th chapter the study will focus on investigating empiric evidence related to some of the phenomena discussed in the earlier parts of the text, namely the effects of higher capital ratios on financial stability, cost of capital and lending margins, and output in the Nordic countries. We start out with a simple look into the evolution of capital ratios of the major Nordic financial institutions, and try to establish if stability of the financial system in a limited context of the Nordic countries has improved during the last years, and whether or not there may be a benefit in terms of saved output as a result of reduction in future crises. After this, the focus will turn to the costs that Basel III related capital ratio increases may have on lending margins and lending growth, and output within the region. The empirical part of the study is pulled together by making rough estimates of the net effects of Basel III on the economic prosperity of the Nordic region. The aim of this chapter of the study is thus to establish a general view of the effects of Basel III related higher capital ratios on the financial sector stability and welfare of the Nordic countries.

Graph 3: The Evolution of Core tier 1 Ratios in the largest Nordic Banks 2006-2011. OP-Pohjola Numbers for 2007-2008 are tier 1 ratios. Data source: company annual reports.



For a simple test of potentially evolving financial stability conditions in the Nordics, the study takes a look at the Core Tier 1 capital ratios at select largest and most important financial institutions in the Nordic countries; SEB, Swedbank, Handelsbanken and Nordea based in Sweden, Danske Bank in Denmark, DNB Group in Norway, and Pohjola in Finland. Core tier 1 represents the tightest reported capital ratio in company annual reports, and most closely corresponds to the concept of tangible equity used by the Basel committee in its assessment of the relationship between probabilities of systemic banking crises and capital ratios.

A clear upward trend in core tier 1 capital ratios is evident from the graph 3 above between the years 2006-2011. Overall Swedbank has the highest capital ratio at the end of the period, with 15,7% in 2011. The least capitalized bank in the group is the Norwegian DNB, which starts out with a 6,7% capital ratio in 2006 and ends up with 9,4% in 2011. Nordea, Danske and Pohjola form the middle ranks, with core capital ratios ranging from 7,1% to 11,8% during the period. The three Swedish banks, Swedbank, Handelsbanken and SEB are in general most highly capitalized, having consistently the highest capital ratios during the whole observation period with the exception of year 2006. Considering SEB's particular focus on higher risk business within investment and corporate banking, it may not be surprising to see it having correspondingly the highest capital ratio.

Table 7 presents the yearly core capital ratios for the chosen Nordic banks, their average, and an approximation of systemic crisis probabilities based on estimations by the Basel committee (see table 5 on page 45) corresponding to each year's average core capital ratio. The systemic risk probabilities have been roughly approximated from the results by the models that do not consider changes in liquid assets (i.e. column 3 on table 5), as only Nordic capital ratios are considered in this exercise. Thus the potential effects of likely adjustments by the Nordic financial institutions to the coming liquidity regulation may have been left unaccounted for. As the table shows, the average core capital ratio in 2006 was 7,4%, which corresponds roughly to 4,4 - 3,8% likelihood of a systemic banking crisis. In other words, this would correspond to a crisis on average every $(1/0,044 - 1/0,038)$ 23-26 years. The average core capital ratio had risen to 12,5% in 2011. At this level of capital, a systemic crisis can be expected approximately $(1/0,006 - 1/0,005)$ every 167 – 200 years. Between 2006 and 2011 the average core capital rose 5,1 percentage points from 7,4% to 12,5%. This is considerably above the 3 percentage point increase in minimum common equity requirement introduced with Basel III documents published during the observation period, from 4% to a minimum of 7%, as seen on table 3 on page 25.

Table 7. Core capital ratios 2006-2011 and corresponding systemic banking crisis probabilities in percent, as presented on Table 5, column 3 (models not assessing changes in liquid assets). Data source: company annual reports. Author's contribution.

	Swedbank	Handels- banken	SEB	Nordea	Danske Bank	DNB Group	Pohjola	Average Capital Ratio	Corresponding systemic risk probability (approximation)
2006	6,5	6,8	8,2	7,1	8,6	6,7	8,2	7,4	4,4 - 3,8
2007	8,5	10,6	9,9	8,3	6,4	7,2	7,5	8,3	3,0 - 2,4
2008	9,7	9,8	10,1	8,5	8,1	6,7	9,4	8,9	2,2 - 2,0
2009	12,0	12,9	13,9	10,3	9,5	9,3	11,8	11,4	0,9 - 0,6
2010	13,9	13,8	14,2	10,3	10,1	9,2	10,5	11,7	0,8 - 0,6
2011	15,7	15,6	13,7	11,2	11,8	9,4	10,3	12,5	0,6 - 0,5

These results would imply a serious decrease of risk within the Nordic banking system, to the tune of 8x (from roughly 4% to 0,5%). Of course, this modest exercise is far from credibility and perfection, and several factors should be taken into account before making any assumptions based on this result. First, the Nordic banking system is highly integrated to the global financial network, which means that risks can be imported from elsewhere, and intra-Nordic problems possibly mitigated with access to financial markets elsewhere. Second, the study focuses on only 7 large financial institutions within the Nordics, and leaves several other players within the Nordics out. It seems however somewhat likely that the observed increasing trend with regards to capital ratios is true for these other unmentioned financial market participants in the Nordics as well. Third, the systemic risk probabilities, although from a study by the Basel committee, should be taken with a pinch of salt. The models and estimations the risk probabilities have been derived from are by their nature not necessarily 100% accurate descriptions of reality, or of future events. Practice and real life have shown that events considered impossible or highly unlikely do happen, and while the likelihood of a bank failure may be lower, it does not mean that the next crisis is 30 or 140 years away. The likelihood is just smaller than it was before, but the next crisis could just as well be awaiting across the street. This is to say that the estimations about crisis probabilities may not be very accurate, or useful at all. No-one knows when a trader blows up a bank with illegal trades (as happened to Barings bank in the UK in 1995), or if politics of the European Union cause a total implosion of the world financial market. Real life is always more complex than what the output from models may lead on to think. In the end the average core capital number may also be somewhat misleading, as the failure of the least capitalized bank might be enough to set off a

financial crisis; thus providing reason to suspect that the chain may be only as strong as its weakest link.

What can we derive from the results? That core capital ratios are higher now than in 2006 for the major Nordic banks, and that it is likely that this has made the financial system, if considered only in a closed Nordic environment, somewhat safer. Even this is of course good news. But is this increase in capital levels a result of Basel regulation, of the recent financial crisis or of some other reason? A review of the various statements made in the annual results publications by the banks considered here shows, that the banks follow Basel developments closely, and generally consider it to be beneficial to have a substantial capital buffer above the regulatory minimum to meet any future challenges and opportunities. This is reflected for example with OP-Pohjola, the main group the listed Pohjola entity is part of, raising its capital target to 15%, as explained in their Q1/2012 results announcement. Of course the crisis has made financial security and therefore, as a representation of security and stability, capital ratios central to banks' image, and as a result a target of greater attention than what it was before. Thus it seems likely that both Basel regulation and the financial crisis have had an effect of increasing the core capital ratios.

6.2. The Benefits of higher capital ratios in the Nordics

Based on the evolution of systemic risk probabilities and core capital ratios presented in table 7, the study will next make an effort to provide a quantified estimate of the future GDP saved as a result of averted financial crises due to higher levels of capital. As a basis for potential future crisis costs, the estimations of prior historical financial crisis costs in the Nordics by the Basel committee are used. The sample is not exceedingly large, but gives a range of numbers to work with. At the low end Norway survived the pan-Nordic banking crisis of the late 1980s - early 1990s relatively unscathed with peak to trough loss of output of only 1,5% of GDP, and cumulative loss estimates ranging from 0 to 34,8% of GDP. Sweden suffered slightly more, with peak to trough GDP contraction of 5,8%, but with very similar estimated cumulative losses of 3,8% to 30,6% of pre-crisis GDP. Finland was by far the hardest hit, with peak to trough GDP loss of 11,8% and cumulative loss estimations in the range of 40,6% to 59,1% of output. Denmark on its part managed to weather through the period without a crisis.

Table 8. Costs of prior banking crises as a percentage of pre-crisis GDP in the Nordics (adapted with author's contributions from the Assessment of the Long Term Economic Impact of Stronger Capital and Liquidity Standards (2010: 38).

	Start of crisis	Peak to trough	Cumulative losses until end of crisis*	Cumulative losses allowing for permanent effects*
Denmark	no data	no data	no data	no data
Finland	1991	11,8 %	40,6 % - 59,1 %	97,2 % - 473,9 %
Norway	1987,1988	1,5 %	0,0 % - 34,8 %	34,8 % - 313,5 %
Sweden	1991	5,8 %	3,8 % - 30,6 %	16,7 % - 256,7 %
Average		6,4 %	27,6 %	214,4 %

*min-max range of multiple estimations

Average for peak to trough drop is 6,4% of pre-crisis GDP, with average cumulative losses 27,6% and allowing for permanent effects arising from lower growth path, average loss of output is staggering 214,4% for the countries in question. Using a simple method established by the Basel committee in its Assessment of the Long Term Economic Impact of Stronger Capital and Liquidity Standards (2010: 3), the benefits from higher capital ratios and lower likelihood of systemic crisis, as presented in table 7, can be determined simply by calculating: probability of banking crisis multiplied by the discounted multi-year output costs. Table 9 presents a yearly crisis cost calculation based on the systemic risk probability approximations of table 7 and average, minimum and maximum crisis costs in the Nordics as estimated in table 8.

Table 9. Systemic risk probability multiplied by estimated cost of financial crises in the Nordics. Based on data from the Basel committee's Assessment of the Long Term Economic Impact of Stronger Capital and Liquidity Standards (2010), and on calculations by the author.

Average Nordic Core capital ratio		Probability of systemic banking crisis*	Probability x cost with Cumulative losses**	Cumulative losses with permanent effects			Average crisis probability x costs over all scenarios	
			Min	Average	Max	Min	Average	Max
Crisis cost scenarios			0,00 %	27,60 %	59,10 %	16,70 %	214,40 %	473,90 %
2006	7,4 %	4,10 %	0,00 %	1,13 %	2,423 %	0,68 %	8,79 %	19,43 %
2007	8,3 %	2,70 %	0,00 %	0,75 %	1,596 %	0,45 %	5,79 %	12,80 %
2008	8,9 %	2,10 %	0,00 %	0,58 %	1,241 %	0,35 %	4,50 %	9,95 %
2009	11,4 %	0,80 %	0,00 %	0,22 %	0,473 %	0,13 %	1,72 %	3,79 %
2010	11,7 %	0,70 %	0,00 %	0,19 %	0,414 %	0,12 %	1,50 %	3,32 %
2011	12,5 %	0,55 %	0,00 %	0,15 %	0,325 %	0,09 %	1,18 %	2,61 %

*Averaged from the approximations in table 7

** Simple peak to trough losses insignificant in the long run, and thus not included

Table 10. The evolution of average Nordic capital ratio, probabilities of systemic banking crisis and a rough estimate of yearly output saved in the Nordics as a result. Sources: Corporate annual results, the Basel committee's Assessment of the Long Term Economic Impact of Stronger Capital and Liquidity Standards (2010), with the author's contributions.

Average Nordic Core capital ratio		Probability of systemic banking crisis	Average crisis costs over all scenarios	Average output saved*
2006	7,4 %	4,10 %	5,41 %	
2007	8,3 %	2,70 %	3,56 %	1,85 %
2008	8,9 %	2,10 %	2,77 %	0,79 %
2009	11,4 %	0,80 %	1,06 %	1,72 %
2010	11,7 %	0,70 %	0,92 %	0,13 %
2011	12,5 %	0,55 %	0,73 %	0,20 %
From 2006 to 2011	+5,1 pp**	-86,59 %	-86,51 %	4,68 pp**

*Decrease in crisis costs over previous year, as a percentage of the level of output

** Percentage points

First of all it must be noted that simple peak to trough GDP losses (as per table 8 on page 55) were not included in the calculations in tables 9 and 10, as they posed insignificant losses of output in the long run. This may mean that the crisis costs, and thus the benefits of higher capital ratios, may be somewhat overstated. Despite this, the results from tables 9 and 10 show a clear and significant decline in potential output lost to future financial crises as a result of the lesser likelihood of systemic banking crises, arising from higher capital ratios since 2006. This is in line with the similarly significant estimated reduction in probability of systemic banking crises using the Basel committee capital ratio to banking crisis studies, as per table 7. Second, considering the huge variation in crisis cost estimations (from 0,00% to a massive 473,90%, table 9), the average crisis cost over all scenarios –number from table 10 must be taken with a lot of salt. In essence, the benefits of higher capital ratios may either be very small, or much larger, depending on the scale of events prevented by higher capital ratios. The numbers produced in table 10 are averages, and thus do not show the extreme events. And to make things worse, in reality it is difficult to see the benefits in something when the benefits arise from situations completely avoided (one does not appreciate the money paid for insurance if nothing ever happens).

Assuming the Basel committee estimations about capital ratios and the probabilities of financial crises are accurate, the increase in the capital ratios of major Nordic financial institutions between 2006 and 2011 has not only decreased the likelihood of a systemic banking crisis, but accordingly it has also resulted in a 4,68% higher long run level of economic output. Corresponding to the diminishing returns with capital ratios and crisis probabilities, the estimated increase in welfare, or long run level of GDP, as a result of higher capital ratios is strongest between 2006 and 2008, when average Nordic capital ratios increased 1,5 percentage points from 7,4% to 8,9%. The average output saved (or the higher long run level of GDP as a result of less likely future crises) during this period was 2,64%. Between 2008 and 2011 the average Nordic core capital ratio increased 3,6 percentage points, or from 8,9% to 12,5%. This increase in capital ratios brought about a 2,05% increase in long run level of GDP.

To clarify the situation, the cost of future financial crises was determined simply by multiplying the probability of crisis (taken from Basel committee estimations) with the lost output resulting from crises (averaged from estimated prior Nordic crisis costs). Thus the smaller the probability of crisis, or the less output lost per crisis, the lesser the costs of financial crises. To use the insurance example, higher capital ratios are the fees that must be paid to be covered by insurance. Paying the insurance fee will offset or reduce completely the negative effects, should an insurance event (or a financial crisis) happen. If you are uninsured, then you may lose your house and with it perhaps your tools necessary for producing work – decreasing your

future output (in other words, crises may have permanent negative effects on the level of output). But of course, paying the insurance fee is a cost as well in itself, which needs to be taken into account when calculating potential costs and benefits of signing up for an insurance program, or for tighter financial regulation. This is where the study will turn to next.

6.3. The Effects of higher capital ratios to cost of capital, lending margins and output in the Nordics

Based on the cost estimations in other studies presented earlier on page 48, this study maps the potential rise in cost of capital and lending margins, and effects to output as a result of the clear increase in core capital ratios of the major Nordic banks. The potential effects of liquidity rules will be neglected, and the focus will be solely on capital ratios and their effects. As per page 49 of this study, 1 to 2 percentage point increase in capital ratio is estimated to result in a 5 to 38 basis point increase in lending margins, and in 0,07% to 1,02% decrease in the level of output. Correlations between these cost estimations and the increase in core capital ratios of the Nordic banks is presented in table 11, which roughly estimates the costs of the increased capital ratios of the past 6 years.

Table 11. Core capital ratios and related costs in terms of cost of capital/lending margins and level of output. Author's contribution.

Average Nordic Core capital Ratio		Percentage point change over previous year	Cost of regulation in terms of cost of capital or loan rates*			Cost of regulation in terms of lost output**		
			Min	Average	Max	Min	Average	Max
			5	12	19	0,07 %	0,29 %	0,51 %
2006	7,40 %							
2007	8,30 %	0,90 %	4,5	10,8	17,1	0,063 %	0,261 %	0,459 %
2008	8,90 %	0,60 %	3	7,2	11,4	0,042 %	0,174 %	0,306 %
2009	11,40 %	2,50 %	12,5	30	47,5	0,175 %	0,725 %	1,275 %
2010	11,70 %	0,30 %	1,5	3,6	5,7	0,021 %	0,087 %	0,153 %
2011	12,50 %	0,80 %	4	9,6	15,2	0,056 %	0,232 %	0,408 %
Total		5,10 %	25,5	61,2	96,9	0,357 %	1,479 %	2,601 %

* In terms of basis points, per 1 percentage point increase in capital ratio.

**In terms of GDP level, per 1 percentage point increase in capital ratio

As a result of higher capital ratios, cost of capital in the Nordic countries may be expected to have increased between 25,5 to 96,9 basis points, or 0,255 to 0,969 percentage points. It is reasonable to expect that banks will pass this increase in cost of capital on to their customers, directly increasing loan rates in a similar fashion. Thus where a loan interest rate may have been, for example 3% before, after these effects it would be expected to be between 3,255% and 3,969%. Higher cost of financial intermediation may also have economy-wide effects on output, lowering the GDP. These negative effects to output are estimated to be between 0,357% and 2,601% of the level of GDP. These costs are substantial, but comparing to the benefits presented in table 10, the net effect of higher capital ratios seems to be beneficial.

These results do not account for the costs of the new liquidity regulation, which will also have effects on banking activity, through cost of capital and lending margins. As established on page 49, the liquidity requirements are expected to increase the costs of capital and loan rates by 23 to 25 basis points and lower the long run level of GDP by 0,08% upon full implementation. The associated benefits of more robust liquidity positions are difficult to establish. As presented in table 6, the liquidity regulation brings net benefits only at the high crisis cost scenario at 12% and 13% capital ratios, as estimated by the Basel committee.

6.4. Capital ratios and bank lending in the Nordics

After mapping the expected impacts of higher capital ratios to stability, lending margins and the long run level of output, the study provides some empirical views with regards to capital ratios and lending growth in the Nordic region. An original aim of the study was to appropriate two regression models used in US context to the Nordic region to model the relationship between growth in capital ratios and in lending, following the example of Bernanke and Lown (1991: 222, (1)) and Berrospide et al (2010: 30-31, (4)). This effort was essentially fruitless due to lack of data; successful implementation would have required the construction of a dataset that is an effort beyond the scope of this thesis.

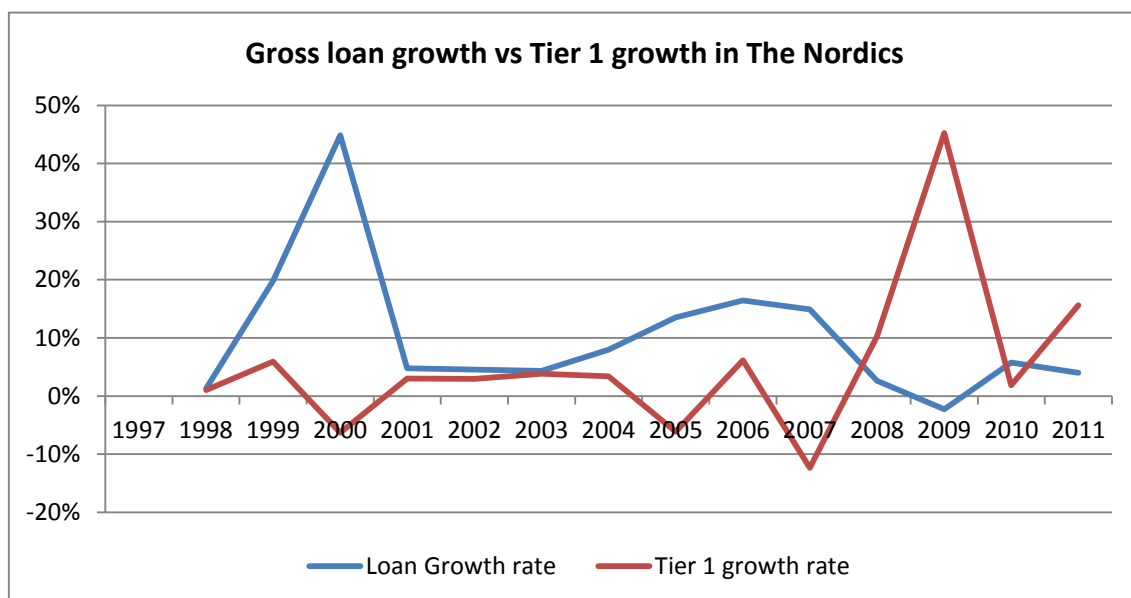
The only result approaching credibility found with the aforementioned modeling efforts was a negative relationship between loan growth and tier 1 capital ratio growth, significant at the 10% level. The model was simply $\Delta \text{Loan Growth} = \Delta \text{Tier 1 ratio}$. Changes in Tier 1 capital could explain approximately 24% of the changes in Nordic loan growth, with a coefficient of -0,43. This is as would be expected from the theory – higher capital ratios come at the expense of loan growth. Specifically, 10% increase in Tier 1 capital would result in $10 \times -0,43 \times 0,244\% = -1,05\%$ decrease in gross loan growth. No noteworthy results were achieved using equity

capital to total assets ratio to explain loan growth. Details of the results of this exceedingly simple regression in the spirit of Bernanke and Lown can be found in Appendix 1.

This result could at best be considered to be slightly pointing towards a conclusion that the act of raising capital ratio may have an adverse effect on lending. The model has for example a serious omitted variable problem, the time series data coincides with a depression and an increase in capital requirements, both of which are bound to affect loan growth and capital ratios in inverse manner etc. In addition, the explanatory variable of Tier 1 growth rate is not a lagged measure as with Bernanke and Lown's study. As the variable is not lagged, it is more difficult to claim that the changes in capital ratios may drive loan growth process, but rather are simply correlated with it. This seems likely as the capital ratios are by definition related to the amount of assets (loans) on a bank's balance sheet. Granger causality tests with 1 and 2 lags found no significant results, further strengthening no causation case. As mentioned before, these results are however obtained with somewhat inadequate amount of observations and with not exactly matching variables compared to Bernanke and Lown's study, and thus should not be taken as a refutation of their findings within a Nordic context.

In addition to these regression results, some simple empirical relationships were found that may act as support to the other parts of the study. These graphs and correlations are presented next. The data for all of these results, including the simple regression mentioned in above paragraph, was sourced from BankScope, an online banking information database by Bureau van Dijk. The data used can be found in the Appendix section of this thesis. It must be noted that the Tier 1 capital ratio data provided by BankScope and used in this section of the study differs from the Core Capital ratios reported by banks themselves, and used in chapters 6.1-6.3.

Graph 4: Gross loan growth and Tier 1 capital ratio growth among the major Nordic banks between 1997 and 2011. Data source: BankScope.

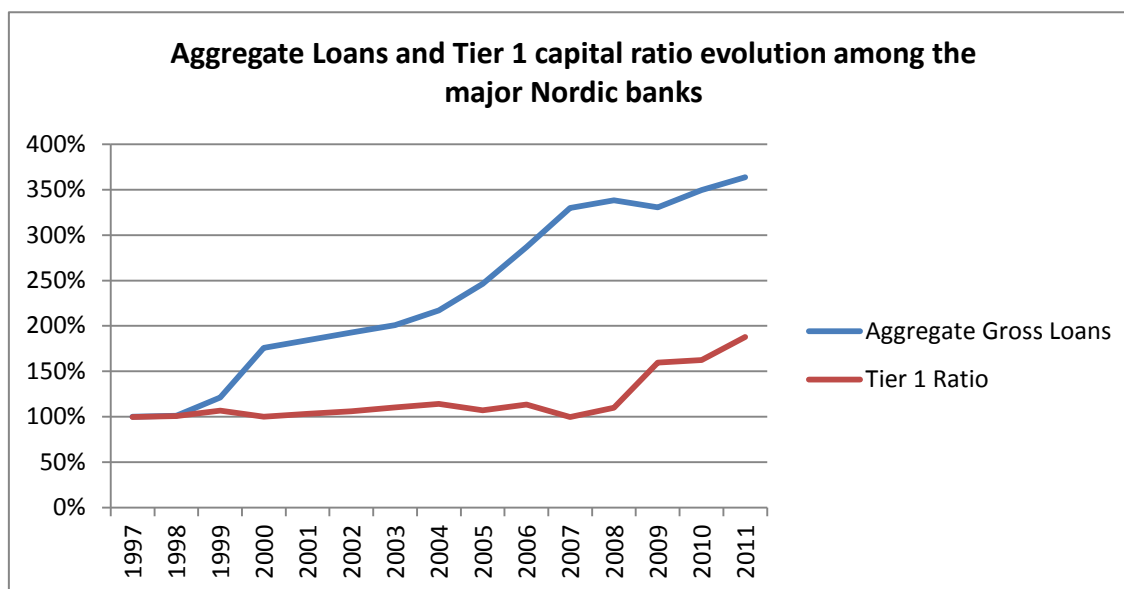


Graph 4 plots the aggregate loan growth of Swedbank, Handelsbanken, SEB, Danske Bank and Pohjola. Nordea and DNB were left out of the dataset due to inconsistencies with available data. Tier 1 ratio is a weighted average composite of the Tier 1 capital ratios of the 5 banks in the loan sample, with weights as $(\text{Bank}_i \text{ gross loans} / \text{Gross Loans Among All banks in the sample})$. Loan growth rates were calculated as $((\text{Gross Loans}_t / \text{Gross Loans}_{t-1}) - 1)$. A similar method was used to calculate the evolution of Tier 1 capital ratios. Visually there seems to be a clear negative correlation between loan growth and Tier 1 capital growth rates. This can be confirmed with a mathematical correlation of the two data series, which yields a result of -0,494.

The negative correlation between loan growth and tier 1 capital growth means that in the dataset loans and capital ratios tend to grow in opposite directions; when one increases the other decreases. It must be kept in mind that correlation does not equal causation, and a variety of things (such as the crisis and higher capital requirements during the period) may explain the phenomenon. The result is however in line with the theory presented earlier in this study about negative effects of higher capital ratios to loan growth, and with the simple regression mentioned in the previous page. For further analysis graph 5 plots the evolution between the level of aggregate loans by the 5 banks, and the Tier 1 capital ratios. Over time both have been going up, and accordingly these two data series have a positive correlation of 0,667. This should imply that over the long term increase in loan supply and higher capital

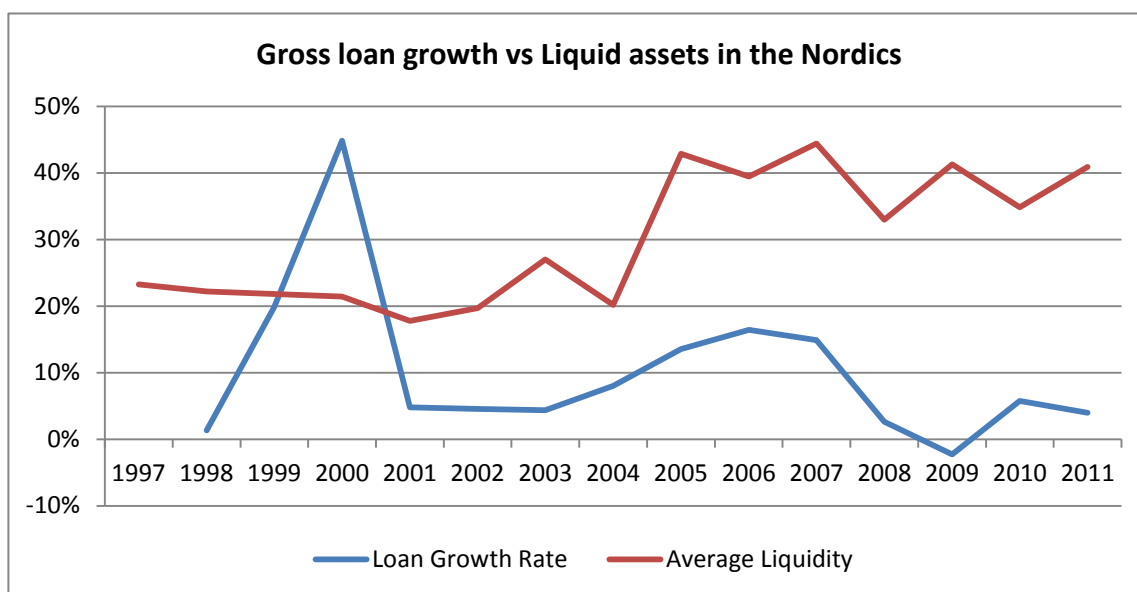
ratios are not mutually exclusive, but rather the act of increasing one's capital ratio takes a momentary toll on credit creation.

Graph 5: Aggregate Gross Loan and Tier 1 Capital ratio evolution between 1997 – 2011 among the selected Nordic banks. Data source: BankScope.



Basel III guidelines increase both the capital and liquidity requirements. Mapping loan growth rates to the weighted average Liquidity ratio (as Liquid assets / Deposits and Short Term funding), we can see in graph 6 the collective 5 bank liquidity ratio sharply increasing in the latter part of the sample period, while at the same time lending growth goes down. This may of course be due to increase in liquid assets, or decrease in deposits or short term funding, or all of these together. And it is very much possible that during the financial crisis all of these did happen simultaneously, coinciding also with a decrease in lending growth as a result of the wider economy slowing down. These two data series have a correlation of -0,147. While this slight negative relationship may be more effectively explained by the mentioned environmental effects, it also points to the same direction that was expected by the theory and Basel committee estimations of small costs in terms of 23-25 basis point hike to cost of capital/loan rates or 0,08% of long run output. In short, the relationship uncovered by 1997-2011 data is not in disagreement with prior expectations.

Graph 6: Gross loan growth and Liquid assets as a percentage of deposits and short term funding among the major Nordic banks between 1997 and 2011. Data source: BankScope.



6.5. Summary

Between 2006 and 2011 the core capital ratios of the seven major banks in the Nordic region have increased from an average of 7,4% by 5,1 percentage points to 12,5% of risk weighted assets. This is a significant increase, which has likely resulted in a much more stable financial system in a purely Nordic context. Using crisis probability and cost estimates by the Basel committee, and estimates of the costs of regulation the study established the evolution of stability and resultant effects on long run GDP and lending margins. Compared to 2006, the likelihood of a systemic financial crisis, in a closed Nordic context, can be expected to be approximately 85% lower in 2011. As a result, long run level of output may be expected to be 2% to 4,32% higher as a result of financial crises avoided. This benefit is believed to carry the cost of higher lending margins arising from higher cost of capital for banks resulting from higher capital ratios. Lending costs may be expected to rise as a result by 25 to 97 basis points. Full implementation of the Basel III liquidity requirements would further increase lending margins by approximately 23-25 basis points.

All of this analysis rests on the two pillars of theoretical estimations presented, and on the core capital ratios reported by the major Nordic banks. Both the estimations and core capital ratios used may be questioned. Estimations provided by the Basel committee on financial

stability, costs and benefits of regulation may be expected to be somewhat biased, as the Basel committee certainly has an interest in providing positive argumentation and rationale for its own actions. This may result in an overly optimistic representation of the effects of capital and liquidity regulation. On the other hand, the estimations provided by the Basel committee are based on a compilation of data from several different models producing a variety of results. This, and the fact that non-Basel reported estimations were used as well, should at least somewhat reduce the possible bias within the estimations provided by the committee and used in the thesis.

In addition, the estimations about crisis probabilities, costs and capital ratio effects are based on historical data from a wide variety of different countries and economies. First of all historical information may not tell us anything about potential future; unexpected and unlikely things happen all the time, with no prior historical precedent. Second, since the data comes from a wide variety of sources, it may not reflect the particular realities found in the Nordic countries and thus be somewhat misleading. Finally, the core capital ratio numbers reported by the banks themselves may not all be 100% comparable and accurate. Both the capital definitions and rules have changed between 2006 and 2011, and of course the banks have an incentive to report their affairs in the most positive light possible. Perhaps as a reflection of this, the capital ratios for a given year sometimes differ between annual reports. An effort was made in this study to provide the most consistent numbers possible. What is clear in the end, is the fact that core capital ratios have increased significantly since 2006. It is also very reasonable to assume that this increase in capital ratios has made the banks more capable of withstanding potential financial shocks. In other words safer and more stable

Table 12: Summary of the costs and benefits of higher capital ratios in 2011 compared to 2006. Lending margins in basis points and net benefits in relation to GDP level. Author's contribution.

Cost Scenario	Increase in lending margins ex liquidity cost	Increase in lending margins with liquidity cost*	Cost of regulation (% long run GDP)	Net benefits ex liquidity cost**	Net Benefits with Liquidity cost***	Estimated likelihood of a systemic banking crisis
Min	25,5	48,5	0,36 %	4,32 %	4,24 %	2006: 4,4 - 3,8 %
Average	61,2	85,2	1,48 %	3,20 %	3,12 %	
Max	96,9	121,9	2,60 %	2,08 %	2,00 %	2011: 0,6 - 0,5 %

*23-25 basis points

**4,68% average output saved (table 10) less cost in terms of output from table 11

***Additional liquidity regulation cost of 0,08% GDP

7. ACADEMIC AND INDUSTRY VIEWS ON BASEL III

7.1. Academic critique on Basel III

Atkinson and Blundell-Wignall (2010) provide a broad critique and exposition of the deficiencies of the Basel guidelines, finding several issues where both Basel II and III fall short of effectively reaching their target of functional financial regulation. A major flaw identified is the fact that both Basel II and III asset risk weights use an assumption of portfolio invariance – which means that the capital required to back loans is based on the risk of individual loan characteristics, and does not take into account the portfolio into which it is added to. This may lead to favoritism of certain types of products at the expense of proper diversification, and portfolio concentration that may actually increase risks.

Another unaddressed problem brought up by Atkinson and Blundell-Wignall is the fact that regulatory and tax arbitrage is still very much alive with Basel III. Differences in capital weights between different products mean that banks are able to game the system to achieve lower than intended capital requirements for particular “risk buckets”. This manipulation is tied essentially to incentives arising from different tax treatments and to the ability to reconfigure credit as capital market instruments to avoid capital charges and reduce tax burdens. Atkinson and Blundell-Wignall provide a simple yet powerful example of how banks can reduce the effective capital charge of a loan by using several counterparties and different types of instruments, from USD 80 to USD 18,60. Similarly an example of a risk increasing tax arbitrage is provided. Thus the ability to transform risk and game the risk weights enables higher than intended leverage within the financial system.

The liquidity regulation proposals also draw critique from Atkinson and Blundell-Wignall. Above all, they argue that liquidity management should be left to the market and supervisors should only focus on solvency issues and crisis resolution regimes. They see the Liquidity Coverage Ratio as favoring government bonds at the expense of private sector lending. Additionally, government bonds are also clearly not as safe assets as once thought. The Net Stable Funding Ratio is seen as troublesome because it depends on the ability of firms and supervisors to model investor behavior that is deemed as “stable” or “unstable” depending on the economic situation. This seems like a difficult task at best. In addition, Atkinson and Blundell-Wignall fear that the new requirement of liquid assets may lower returns for banks, which may in turn lead to even more risk taking in order to make up for the loss of profitability.

Finally they doubt that the leverage ratio and new capital ratio requirements are enough to rein in the risks in the banking system.

Blinder (2010) does not target Basel III per se, but takes an overall look at the problems of financial regulation, focusing on American experiences and problems unveiled by the financial crisis of 2007. He brings forth a strong argument for a specific systemic risk regulator; a regulator that supervises across markets and across different types of businesses for system wide risks. In hindsight the problems with mortgages could have and should have been seen ahead of the crisis, according to Blinder. In addition current regulatory environment does not address the Too Big To Fail problem, where the largest banks and financial institutions have grown to such dimensions, that trouble or bankruptcy with one would mean a disaster for the whole financial system. Compensation arrangements, irresponsible corporate boards and proprietary trading operations are also mentioned as potential unaddressed problems. Blinder brings up several other issues, but which are now being addressed by the Basel III framework. He worries though, that since Basel III requires international agreement and a long period of adoption, the changes may come too late or not at all.

A more radical view on reforming regulation is taken by Brunnermeier et al (2009), who make the overarching claims that regulation needs to be strictly rule based, time and state varying (light during normal periods, increasing as systemic threat builds up). They claim that minimum capital ratios are not useful in the first place as they do not provide resilience, but rather represent a tax. Capital requirements should rather be target levels, with statutory and forceful ladder of increasing sanctions for failure to meet them. Micro (individual institution based) and macro (systemic) prudential regulation should also be separated, with micro prudential regulation maintaining similar features to the Basel arrangements, while macro prudential regulation should be countercyclical to fight bubbles. They bring forth a call for stronger global financial system oversight and resolution mechanisms, and further need to reduce the concentration of the financial system under a small number of mega-banks.

Furthermore, in line with Atkinson and Blundell-Wignall's description of arbitrage problems with Basel III, Brunnermeier et al describe the boundary problem of financial regulation in great length. If regulation is effective, it will result in a constrained position for the financial firms, which may result in a lower profitability and return on capital. This in turn creates an incentive to move business to the non-restricted sector in order to catch the higher return opportunities there. The incentive to circumvent regulation increases with the effectiveness of the regulation. Brunnermeier et al go through several problems and potential solutions to the boundary problem of regulation, but finally concede that perhaps the best way to avoid the

problems is just to be aware of them and design the regulatory system in a way which minimizes potential systemic hazards arising from the boundary problems to threaten the survival of the financial system as a whole.

Kashyap et al (2010) raise the issue that while higher capital ratio requirements may not increase costs of credit all that significantly, they might have adverse effects as to how credit will be provided in an economy. Different regulatory treatments will create products that are preferred by banks and lenders at the expense of others. To prevent regulatory arbitrage that may result from bank capital regulation and asset risk weights, they suggest that capital standards should be imposed on any holder of a given asset class, instead of the type of organization handling the business as with the existing Basel framework. Although this would likely still result in preferred and not-preferred products, it would mitigate the boundary problem described by Brunnermeier et al between the banking and so called shadow banking sectors. Purely asset based capital charges could be made time-varying to complement macro prudential regulation, in other words, the capital charges would be higher during boom periods.

7.2. Industry views and practical approaches to the challenges posed by Basel III to the financial sector

On a general level the financial industry seems to accept the new regulations of Basel III; the crisis of 2007 and beyond has been very effective in convincing the industry players that stability is a worthy objective for regulation, essential for economic growth and the success of the financial system as a whole. This general level acceptance does not mean that there haven't been voices of dissent and concern from the industry. The most visible figure opposing and criticizing Basel III (and several American regulatory initiatives) has likely been James Dimon, the CEO of JP Morgan. In an interview with the Financial Times, Dimon has called Basel III regulation anti-American, claimed that it is unfair to global banks and investment banking services in particular². In another interview Dimon has stated that Basel III makes banks unwilling to lend, holding back economic growth³. Mr. Dimon's concerns for problems within the competitive landscape of financial industry as a result of Basel III are echoed by Andrew

² Available online at <http://www.ft.com/intl/cms/s/0/905aeb88-dc50-11e0-8654-00144feabdc0.html#axzz20CWitNvK>

³ Available online at <http://www.gfmag.com/archives/140-julyaugust-2011/11317-jamie-dimon-leads-banks-basel-iii-battle.html#axzz20CjAu7oA>

Bailey, the Director of UK Banks and Building Societies division at the UK Financial Services Authority. In an April 2012 speech⁴ Bailey voices a broad support for Basel III initiatives, but brings up the point that Basel III with its long time frame of implementation and many unfinished parts of regulation brings uncertainty to the banking business, that makes planning for the future harder for banks. He sees clarity of regulatory rules as an essential ingredient of effective and successful regulation, and of well-functioning financial markets. A similar sentiment to Dimon's and Bailey's can be found in a statement by the European Banking Federation, in which the President of the Federation Christian Clausen makes it clear that the European banks represented are concerned about maintaining a globally competitive and level playing within the financial industry. If the regulatory environment becomes fragmented, there is a risk that banking activities will move to places with more accommodative and competitive regulatory environment (European Banking Federation, 2012).

Several trade organizations within the financial industry have also voiced concerns over particular parts of the new Basel III framework. A BAFT-IFSA (standing for The Banker's Association for Finance and Trade and The International Financial Services Association) presentation⁵ by Senior Vice President Tod Burwell brings forth a critical view on Basel III, from the perspective of trade finance. The position presented is based on a fear that Basel III may have unintended consequences that will negatively impact the availability and cost of trade finance, at the expense of GDP growth and employment. The fundamental view is that trade finance is unjustly punished with excessively high asset risk weights in Basel III, that do not accurately reflect the actual riskiness of trade finance products. Too high risk weights bring up the costs of trade finance and as a result, lower the volume of said financing. A position paper by the International Chamber of Commerce ("ICC") voices similar concerns, with relation to the leverage ratio constraint and handling of off balance sheet items with Basel III. The handling of trade finance products is seen as unjust and economically harmful (International Chamber of Commerce, 2010). Both the ICC and BAFT-IFSA papers propose several adjustments and changes to fix the situation. In response to these views, a "Joint Industry Communication on Proposed Increased Cost of Trade Finance" was released and signed by heads of several financial industry trade organizations, in which they urge a reconsideration of the Basel III regulation with regards to trade finance⁶.

⁴ Available online at <http://www.fsa.gov.uk/library/communication/speeches/2012/ab-0427>

⁵ Available online at <http://www.fiba.net/files/389.pdf>

⁶ Available online at http://www.cba.ca/contents/files/misc/msc_20101102_jointtradefinanceletter_bil.pdf

In addition to perceived problems in trade finance, similar issues have been voiced with other forms of export financing. A European Banking Federation paper discusses several issues with the leverage ratio, the liquidity and funding requirements and medium-to-long term export financing. The problems are close to those presented with trade finance; too restrictive leverage ratio with regards to export finance realities, unjust treatment with regards to actual riskiness of the business etc. Like its cousin trade finance, export financing is seen as too harshly regulated with regards to the risk profile and practical reality of the business.

A thorough mapping of the Basel III related costs and potential approaches to adjustment is presented by McKinsey & Company's report on Basel III and its impacts on European banking sector. In the report Härle et al (2010) identify massive need for additional Tier 1 capital relative to Q2/2010 situation, to the tune of EUR 1,1 trillion for the European banking sector, and USD 870 billion of Tier 1 capital for the US banking sector. Taking balance sheet growth to 2019 and the new liquidity requirements into account, the costs for meeting Basel III are even higher. In absence of mitigating efforts, these costs would have a significant impact on pre-crisis Return on Equity level of 15%, lowering ROE by approximately 4 and 3 percentage points in Europe and the USA respectively.

Härle et al (2010) make an effort to estimate the effects of these higher capital and liquidity requirements on different banking business segments: retail, corporate and investment banking. Retail banking is predicted to be affected mostly by the parts of Basel III that affect the entire bank, namely higher capital and liquidity requirements. On the product level, retail banking is mostly spared of tighter regulation. Liquidity requirements for retail banking products are in general relatively light. The most affected product is short-term retail loans, which will see a significant increase in expected costs due to higher risk weights and liquidity requirements. Corporate banking is similarly primarily affected by higher overall capital target ratios, but several key products of corporate banking segment face significant increases in funding costs, such as long-term corporate loans and specialized lending such as structured and trade finance, and uncommitted liquidity and credit lines to financial institutions. Härle et al believe that banks may not be able to fully pass on the funding cost increases, which may lead to significantly reduced profitability, and eventually supply, of these specific products.

Investment banking segment is seen as the most severely affected line of business. The new treatments related to market risk impact trading and securitization businesses, and especially OTC derivatives, cash trading and securitizations are mentioned by Härle et al. They conclude that resources are tight and an assessment of overall funding, capital and leverage situation is necessary to determine which businesses are to be kept and which to be exited. A useful table

on the rising costs of various product lines is provided by Härle et al (2010: 9), which is reproduced in a limited form here.

Table 13. Estimated Product cost changes under Basel III, in Basis Points. Adapted from Härle et al (2010:9).

Products		Total Increase in Costs*, in Basis Points
Retail	Short-term retail loans	70
Banking	Residential Mortgages < 35% risk weight	25
	Other Mortgages	45
Corporate	Short-term Corporate Loans	45
Banking	Long-term Corporate Loans	50
	Specialized Lending	60
Trading	Government Bonds	-10
Book	Corporate or Covered Bonds > AA-	-10
Securities >1 year	Corporate or Covered Bonds > A- <= AA-	35
	Bonds < AA- or Unrated	70
	Financial Institution (FI) Bonds	80
Off	OTC Derivatives	85
Balance	Corporate Credit Lines (non-FI)	45
Sheet	Corporate Liquidity Lines (non-FI)	75
	FI Credit and Liquidity Lines	85

*Assuming target Tier 1 ratio of 8% under Basel II and 11% under Basel III
in addition, 20% increase in capital cost to account for capital quality measures
Also taking into account effects from Liquidity Coverage Ratio
and Net Stable Funding Ratio as they are phased in.

Härle et al (2010) also provide several adjustment approaches to Basel III challenges, which should help to mitigate the costs and effects on bank Return on Equity. No-regret moves are essentially initiatives that improve capital and liquidity management, and make the organization more efficient in its operations by for example better credit and market risk models, and improved loan-loss provision estimations which may help optimize and reduce the capital and liquidity buffers employed. Balance sheet restructuring is seen as another method of response to the Basel III derived challenges. They note that many banks have only corporate level view of the balance sheet, and that business line-level focus might bring significant benefits. Reviewing various holdings such as minority stakes, holdings in other financial institutions, pension assets etc. are mentioned as potential areas of optimization. Finally, reduction in long-term funding costs is mentioned, which may be achieved by optimized deposit gathering, secured funding instruments and stronger investor coverage to better place

unsecured issuances. Business-model adjustments are the final response to Basel III. Adjustment to the new regulation requires a top-down review of the banks' business portfolios, and Härle et al suggest considerations on product design/mix, customer mix, risk transfer, geographical mix, and finally cost and pricing dimensions. Essentially banks need to figure out a tighter focus for their businesses, based on in which segments they can profitably compete.

In addition to the costs of higher capital and liquidity requirements, Basel III will need an ambitious plan for implementation of the changes that need to take place. Härle and company estimate the practical implementation costs for a midsize European bank at around EUR 45 to 70 million. Major challenges are going to be found especially at the IT, operations and accounting departments. High-quality data on assets, operations and risk measurement is becoming an issue of utmost importance, as it enables banks to fine-tune and optimize their businesses along the tighter capital and liquidity requirements.

8. DISCUSSION & CONCLUSION: WHAT CAN WE EXPECT FROM BASEL III IN THE NORDICS

The Basel III framework guidelines were released in 2010, after the initial shock of a financial crisis that is still engulfing the world, especially Europe. The crisis had made it evident that banks were more fragile than thought and that liquidity issues were important, and prior to Basel III, essentially unregulated. As a response capital requirements were tightened, and new liquidity requirements created, and the framework now covers a wider range of activities and captures more business that was off balance sheet before, which was found to cause problems during the crisis. All in all, the Basel III framework is more demanding and covers more ground than anything before it.

Contrasting Basel III with the basic objectives of regulation; promotion of institutional stability and consumer welfare and the correction of negative externalities and market failures, as per the statements by the Basel committee as shown on page 25, it is obvious that the Basel framework is focusing almost exclusively on institutional stability with the hopes that stable individual financial institutions will take care of the negative externalities and market failure issues; consumer welfare is not in the Basel committee's agenda. Negative externalities and systemic problems are paid some attention in the Basel III guidelines in the form of the pro-cyclical capital buffer, which is to alleviate the pro-cyclicality inherent in the earlier versions of the framework. Even with the broad range of changes and additions with the new version of the Basel framework, it has already received a variety of critique (see chapter 7.1. for a small sample) that proposes everything from small adjustments to a complete rethink of regulatory structures. Thus it seems obvious that Basel III framework is indeed not an endpoint, but a mere stop in the long journey of regulatory evolution that will continue with the future transformations of the economy and its necessities.

Basel III framework sets capital and liquidity requirements that demand higher quality capital instruments, and significantly more of them compared to Basel II. Based on the optimal capital estimates covered in chapter 5 it is however puzzling to see that there is plenty of evidence for the beneficial effects of even higher capital levels, some of it even provided by the Basel committee itself in its assessment of the effects higher capital ratios, raising questions about the seemingly low capital requirements with Basel framework. This deceptively low level of capital requirements may be due to unwillingness to make too drastic changes in one go, or perhaps the low capital requirements reflect the industry's influence on the Basel committee. Whichever the case, capital requirements could arguably be even higher than with Basel III.

The evolution of core capital ratios among the major Nordic banks from 7,4% in 2006 to 12,5% in 2011 is a demonstration of the effects that the implementation of Basel II rules and the subsequent publication of Basel III rules have had in the Nordics. At the writing of this thesis all banks covered by this study already meet and exceed the minimum equity capital ratios decreed by Basel III, well ahead of the official implementation schedule. As a result the effects that the changes in capital ratios may bring are felt long before the actual implementation deadlines imposed by the Basel committee, as presented in table 4 on page 29.

The Basel III framework adjusts bank asset risk weights in a significant manner, which will have serious ramifications for the financial industry. In a scramble to meet the capital requirements banks will certainly optimize their asset portfolios, likely at the expense of the higher risk weighted products. This may lead to problems such as reduced supply or higher prices of certain essential products and contrary effects with others, creating unbalanced preferences between products and creating incentives for circumventing the regulation. The industry responses to Basel III are a good indication of this phenomenon, and for example trade and export finance are feared to suffer heavily due to Basel III. From a Nordic perspective this may be especially unwelcome, considering the countries' high exposure to international trade and reliance on exports. The McKinsey study –inspired table 13 on page 71 is a good indication of the winners and losers of Basel III. Besides trade and export finance, trading operations are set for rough times, as are many loan products. These changes will have impacts on both banks and their clients. Bank trading operations are certainly set to be reduced, while loan financing may be reduced and correspondingly bond financing increased. As a result, banks must adapt their operations to match the new reality of Basel III. Banks with for example more extensive trading operations may thus be at a relative disadvantage compared to those without, as their trading related revenues are set to be diminished as a result of the new regulation. The Nordic banks may also be at a disadvantage internationally, due to their rigorous compliance to the new regulation. Competitors that adapt to Basel III at a slower pace may have an advantage in terms of cost of capital over those that adapt immediately. Of course the market is also likely to perceive these differences, and may reward or punish banks with regards to their reactions to the Basel III regulation.

The results obtained in Chapter 6 indicate a significant overall increase in lending margins, by around 25 to 125 basis points, arising from higher cost of capital resulting from higher capital requirements. Lending growth in the Nordic countries may be expected to be at a reduced level as banks may respond to the higher capital requirements by either reducing their risk weighted assets (i.e. lending), or by charging higher rates from potential borrowers to cover their increased costs. So either lending supply will be reduced, or higher prices will drive

demand down, both resulting in a reduction of lending growth. Although this study did not manage to establish a proper causal connection between lending growth and growth in equity capital ratios, it would be reasonable to assume that the negative relationship between the two, as established by theory and by empirical studies elsewhere, applies to the Nordics as well. The simple correlations between lending growth and growth in Tier 1 capital ratios, and lending growth and liquid assets among five major Nordic banks was found to be of the “right direction”, giving minimal empirical backing to the theory presented in a Nordic context.

Besides the academic and industry critique focusing on the content of the Basel III guidelines, the timing of the publication of the guidelines is questionable. Tightening capital regulation in the middle of a financial crisis seems like a very counterproductive move in the sense of economic growth and promotion of lending activity, further deepening the problems of the financial industry and the economy in general. Although there is a lengthy implementation and adjustment period until 2019, the banks have clearly started to implement the new requirements, and the market expects that of the banks. Of course the crisis exposed problems within Basel II, and the Basel committee certainly has an incentive to improve upon its own work and not to appear to sleep on its job. But intuitively thinking it seems that while the industry has been in the middle of a huge crisis, adding the costs and requirements of Basel III to all other issues at hand may have caused extra stress within the financial sector and markets. Postponing the publication of the new regulation until the financial crisis and the following debt crisis had been fully dealt with might not have been a bad idea.

Furthermore the estimated positive effects of higher capital ratios rest on somewhat fragile assumptions about crisis probabilities, costs and their relationships to capital ratios, and essentially consider the major Nordic banks as a closed financial system, which it obviously is not. The actual benefits of less frequent financial crises are more difficult to establish and in any case come over the period of decades. On the other hand the costs of higher capital ratios are far more material, immediate and easier to quantify. This may also explain the hesitancy of the Basel committee to administer higher capital ratios. In the end it must also be noted that higher capital requirements are very much unlikely to remove financial crises on the whole, not to mention economic depressions. Man-made systems are by their nature prone to dysfunction and imperfection. It is also somewhat simplistic to consider an average number of core capital among the Nordic banks, as the bankruptcy of the weakest capitalized Nordic bank might set off a wave of negative externalities affecting the others, rendering the financial system only as strong as the weakest member. Thus it would be foolish to assume that risks in the financial system are reduced as greatly as the results of Chapter 6 would lead to believe. In the end the benefits of higher capital ratios also depend on the assumption that the 2011

ratios will be sustained indefinitely. The current higher capital ratios compared to the 2006 situation seem to be a positive force towards financial stability and long run economic welfare, with the drawback of higher costs of financial intermediation.

Key findings

- The major Nordic banks are in a relatively robust capital position (especially the Swedish ones), with 5,1 percentage points more core capital in year end 2011 compared to 2006, easily matching Basel III requirements, resulting in a significantly lower likelihood of systemic financial crises in the Nordics
- This may however lead to higher lending margins in the range of 25 to 125 basis points, resulting from higher cost of capital due to disadvantages of equity vs. debt capital
- Lending growth may suffer as a result
- If the core capital ratios are sustained at 2011 levels, in the long run this may however result in net benefits with higher level of GDP by approx. 2% to 4% compared to what may have been expected at 2006 core capital level
- The new rules and resultant cost differences between banking products necessitate adjustments to operations, with especially trade/export finance, trading operations and certain loans and structured finance products under pressure

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APPENDIX

Dependent variable: Loan Growth					
Explanatory variable: Tier 1 Growth	Coefficient	Std. Error	T-Stat	P-value	R ²
	-0,434	0,221	-1,969	0,073	0,244
N	70				
S. E. of regression	0,107				
Sum squared Resid	0,137				
F-Stat	3,877				
Prob (F)	0,072				
Durbin-Watson	1,843				
H ₀ : Tier 1 growth is not related to Loan growth					

Granger Causality test, 1 lag

F-Stat	Prob
0,0292	0,868

Granger Causality test, 2 lags

F-Stat	Prob
0,438	0,662

H₀: Tier 1 growth does not Granger Cause Loan Growth

Swedbank data		Eur mil																		
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011				
Gross Loans		54969	55376	66938	72110	72109	76525	82150	81082	87998	105025	120634	119023	128414	134845	132890				
Tier 1 ratio		6,1	6,1	6	6,89	7,1	7,1	7,2	8,2	6,5	6,54	6,19	8,4	10,4	11	11,2				
Liquid assets / dep + st funds		24,77	20,08	26,45	25,86	27,09	21,52	17,09	21,89	42,52	37,96	37,35	35,06	41,09	30,79	48,6				

Handelsbanken data		Eur mil																		
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011				
Gross Loans		64292	62851	73516	78851	86859	91031	89878	95838	105034	121956	137145	136543	144612	165890	179015				
Tier 1 ratio		6,25	6,26	6,5	6,4	6,1	6,4	7,3	7,6	7,6	6,8	6,5	7	9,1	9,2	9,5				
Liquid assets / dep + st fund		23,76	24,29	18,62	15,1	10,03	10,26	15,8	14,61	22,75	45,94	34,51	31,46	33,93	34,7	43,99				

SEB data	Eur mil																		
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011				
Gross Loans	35912	34919	40522	69938	69463	74440	77863	87684	96744	105883	113721	120133	117612	121535	134294				
Tier 1 ratio	8,22	8,12	10,79	7,37	7,71	7,88	7,97	7,76	7,53	8,19	8,63	8,36	12,8	12,8	13,01				
Liquid assets / dep + st fund	26,21	24,26	28,3	25,27	25,58	20,84	23,71	23,13	60,22	61	68,11	44,8	53,96	38,71	43,45				

Danske bank data	Eur mil																		
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011				
Gross Loans	37883	41863	52648	118710	127411	129488	137285	153028	187478	222786	266737	276543	247199	251733	254894				
Tier 1 ratio	7,2	7,7	7,35	6,76	7,26	7,58	7,65	7,73	7,32	8,63	6,42	6,89	11,23	11,48	16				
Liquid assets / dep + st fund	16,12	19,08	22,18	24,19	23,35	29,05	22,46	27,27	52,77	49,63	49,17	36,07	46,36	48,49	45,74				

Pohjola data	Eur mil																		
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011				
Gross Loans	3326	3936	4778	5694	5986	6773	7566	8664	6778	7882	9308	12311	11469	12641	12924				
Tier 1 ratio	10,1	8,3	7,3	7	7,4	7	7	7,1	9,6	8,2	7,5	9,4	11,8	12,5	10,6				
Liquid assets / dep + st fund	38,74	33,07	26,88	27,73	17,53	19,02	31,35	30,39	96,64	90,17	70,93	70,52	60,89	53,02	53,39				