The Effect of Higher Capital Requirements on Banks' Valuation



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1. Executive Summary

The Basel III requirements were published in 2010, and the impact of these requirements have been, widely and publicly, debated between politicians, scholars and practitioners. Thus, the purpose of this thesis was to investigate to what extent banks' valuations would increase or decrease, when the Tier 1 ratio was hypothetical increased. In order to answer the research question, four sub questions were developed, which led to four interrelated analyses. This then led to the fifth analysis, which sat the frame needed to answer the overall research question, using inputs from the previous analyses.

The focus of the thesis was on the CRD-IV capital requirements, and exclusively on the Tier 1 capital. The analyses were based on data from twenty-five banks headquartered in twelve different European countries. All the banks were of significant importance, as they are all SIFI or G-SIFI banks. Lastly, the time period of interest was from 2006 to 2012.

The first analysis was a strategic framework analysis, which sought to answer whether the sample banks were able to affect their own profitability. The second analysis was a financial analysis, which sought to answer what affected the sample banks' financial value drivers. The third analysis sought to investigate to what extent Modigliani & Miller's theory would hold in real life. This was analysed by using the same approach as Miles et al. (2012), and through multiple regression analyses. The effect of M&M's theory, in real life, was between -4.08% to 6.25%, with no taxes, and between -4% and 3.66%, with taxes, based on level and first difference regressions respectively. Thus, it was concluded that M&M's theory holds to a limited extent in real life. The fourth analysis sought to investigate how a higher Tier 1 ratio affected the banks' financial statements, which was investigated by developing a simple model. It was concluded, within the scope of this thesis, that the Tier 1 ratio affected the banks' financial statements through retained capital, the cost of facilitating the loans, the amount of equity, risk, and the borrowing and lending rates.

These analyses led to the fifth and last analysis, the scenario analysis, which sought to analyse to what extent the banks' values would increase or decrease, due to a hypothetical increase in the Tier 1 ratio. This was answered using the price-earnings and market-to-book valuation models. It was concluded that the banks' values would increase, to a low but significant extent, when the Tier 1 ratio was increased.

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2. Introduction

The Financial Crisis has negatively affected the lives of millions of people and companies all over the world¹. The societal impacts of the Financial Crisis were many and significant, including an increase in unemployment, a decrease in housing prices, an increase in sovereign debt and low or even negative growth². The impact of the Financial Crisis forced governments to take extensive measures, such as providing government guarantees for the financial sector, offering capital and extraordinary liquidity measures and acquiring and liquidating distressed banks in order to reestablish financial stability³.

Most politicians have reached the conclusion that, amongst other, the capital requirements for banks must be increased significantly in order to ensure that banks become less sensitive to defaults of borrowers and thus less likely to cause future financial crises and ensuing recessions⁴. Politicians all over the world have decided that the costs of financial crises and financial instability are much larger than the benefits of having less capitalised banks, which is why the new Basel III requirements have been passed and are scheduled to be fully implemented in Europe in 2019, through the Capital Requirement Directive IV (CRD-IV)⁵.

This thesis is primarily motivated by the publication of Basel III and by the discussions that have taken place in the public sphere. The authors have previously worked with bank valuations and therefore have an interest within this field. Thus, the authors have found it interesting to investigate what the effect of the new capital requirements would be on banks' valuation. The primary focus of this thesis is on the CRD-IV capital requirements, and more specifically the *Tier 1* capital. In order to understand the research question of this thesis, an introduction to Basel III, CRD-IV and the Tier 1 capital requirements will be conducted next. The purpose of the following section is to create a common starting point for the thesis.

¹ Rangvid (2013)

² Ibid.

³ Ibid. 4 Ibid.

^{4 101}d. 5 EBA I

2.1 Introduction to Capital Requirements

The Basel Committee on Banking Supervision (BCBS) is a "forum for regular cooperation on banking supervisory matters" (Bank for International Settlements)⁶. The Basel committee was established in 1974, by the G10 countries to enhance financial stability⁷. The Basel Committee published their first recommendations in the Basel Capital Accord from 1988, i.e. Basel I. Since then, Basel has modified the capital requirements, which have resulted in the second and third Basel Accords also known as Basel II and Basel III, in 2004 and 2010 respectively⁸. The Basel Committee's main purpose is to improve bank regulation, supervision and practice of banks all over the word⁹. Furthermore, the goal of the committee is to develop a common understanding, induce trust, and create a common regulatory playing field, in order to maintain financial stability, prevent bank runs and financial crises¹⁰.

The committee has no legal power, thus, it sets supervisory standards, guidelines and gives recommendation of '*best practice*'¹¹. The expectation is that all national governments implement the recommendations and standards, as the goal of the Basel committee is to ensure regulatory equality¹². The recommendations from the Basel committee are implemented in EU by a European directive called the Capital Requirement Directive¹³. Each European member country then has to implement the European directive into each countries own law. However, the European directive sets the minimum capital requirement, thus, a country can only implement equal to or higher capital requirements for the banks operating in their country. Basel I and II was implemented through CRD-I to III and Basel III is implemented through CRD-IV.

- 6 BIS I
- 7 Ibid.
- 8 Ibid.
- 9 Ibid. 10 Ibid.
- 11 BIS II
- 12 Ibid.

¹³ Søndergaard (2005)

In the figure below a breakdown of the Tier 1 Capital in Basel III and CRD-IV shown.



Figure 1: Basel III & CRD-IV

Source: Internal document from Nordea, see appendix 29 and Accenture I

The Financial Crisis had revealed that banks did not have sufficient capital levels to withstand a financial crisis¹⁴. The base capital, in Basel III, is Tier 1 capital, which has to be met with *Core Tier 1* capital, where goodwill, intangible equity and other noncore elements are not included¹⁵. The *Additional Tier 1* capital is hybrid capital, which means that the capital is converted into shares or impaired, if certain mechanisms take place¹⁶. The banks have to pay an interest on the hybrid capital, which is loss absorbing like equity¹⁷.

In addition, the Basel III requirements contain significant capital buffers for banks, which is primary in place to limit financial distress costs and the probability of bankruptcies in order to increase financial stability¹⁸. The capital buffer includes a *Capital Conservation buffer*, a *Countercyclical Capital buffer* and a *SIFI* buffer. When looking at the capital buffers, the difference between Basel III and the CRD-IV is evident, see figure 1 above. Thus, the Tier 1 capital according to CRD-IV must

¹⁴ Søndergaard (2005)

¹⁵ Accenture I

¹⁶ Clausen & Pedersen (2014)

¹⁷ Ibid.

¹⁸ Søndergaard (2005)

be minimum 8.5% or as much as 16% (depending on the capital buffers), which is a significant difference. There does not seem to be a level playing field, as European banks have to have higher capital requirements than banks in countries just implementing Basel III.

The capital conservation buffer is a permanent buffer of 2.5%. The goal of the buffer is to ensure that banks can absorb losses in significant downturns¹⁹. This buffer has to be met with Core Tier 1 capital²⁰. If this buffer is less than 2.5%, then the profit attributable to shareholders, i.e. dividends, will be restricted in order to make sure the minimum Core Tier 1 requirement is protected²¹. The Countercyclical Capital buffer is between 0% and 2.5%²². Thus, in good times, the buffer will be 2.5%, i.e. banks have to set more aside for bad time, and in times of economic downturn the buffer will be 0%, i.e. banks do not have to set anything aside. This buffer has to be filled with Core Tier 1 capital²³. This buffer is created to make sure that banks have a capital cushion, so if a bank experience high losses, it does not necessarily force them into financial distress or bankruptcy²⁴. Each country can decide on the level of this buffer, however, the buffer is calculated based on the credit-gap²⁵. Lastly, there is a SIFI buffer, which has to be met with Core Tier 1 capital. There are fourteen global systemically important financial institutions, hereafter G-SIFI, in the sample of this thesis and eleven SIFIs²⁶. The Financial Stability Board has decided that the G-SIFI buffer for the G-SIFI banks should be between 1% and 3.5%, depending on the importance of each G-SIFI bank²⁷. Each country decides on the SIFI buffer for the SIFI in that country, for example, Sweden has decided on a SIFI buffer of 5%, and Denmark and the United Kingdom have decided on a SIFI buffer of 3%²⁸. Even though the desire of the Basel committee is to create regulatory equality for banks, the CRD-IV seems to create an uneven playing field. Nonetheless, the beliefs of the Basel committee have been the same since 1988, i.e. higher capital requirements create more financial stability.

- 20 Ibid.
- 21 BIS II 22 EVM I
- 22 EVNI I 23 Accenture I
- 24 Riksbank
- 25 Ibid.
- 26 FSB I
- 27 Ibid.

¹⁹ Accenture I

²⁸ EVM II

3. Research Question

Based on the above introduction to the CRD-IV requirements and the authors' motivation, the research question can be formulated as follows:

"To what extent do banks' value increase or decrease, due to a hypothetical increase in the Tier 1 ratio?"

In order to answer the research question, four sub questions are developed, which lead to four interrelated analyses. These analyses are a strategic framework analysis, an analysis of the banks' financial value drivers, an analysis of Modigliani & Miller's theorem and an analysis of how higher Tier 1 ratios affect the banks' financial statements. The purpose of these analyses are to fully understand what drives the banks' values, what affects the banks' profitability, whether Modigliani & Miller's theory is present in real life, and how Tier 1 ratios affects the banks' financial statements. The purpose of the fifth analysis is to answer the main research question. Thus, the following four sub questions are analysed

- 1. To what extent can banks' affect their own profitability given the external environment?
- 2. What has affected the financial drivers for European Banks from 2006 to 2012?
- 3. To what extent does Modigliani & Miller's theory hold in real life?
- 4. How does a higher Tier 1 ratio affect European banks' financial statements?

3.1 Thesis Design

Firstly, the limitations and the methodology will be described. Then a discussion of the applied theoretical models will follow. Thirdly, the analyses will follow starting with the strategic framework analysis, which is followed by the financial analysis. Then the capital requirement analysis will be conducted, where Modigliani & Miller's theorem will be analysed following a simple model analysis, which will analyse how the Tier 1 ratio affects the banks' financial statements. Lastly, the valuation analysis will be conducted, which will begin with a relative valuation of the banks, using the price-earnings and market-to-book valuation models. The limitations of using these valuation models will then be analysed, which will create the starting point for the scenario analysis, where the effect of a hypothetical increase in the Tier 1 ratio is established on the banks' valuations. Hereafter, the conclusion will sum up the analyses and answer the research question and sub questions. Lastly, the discussion will outline points for further research.

Throughout the thesis, several figures will be used. For a complete list of the figures used, see appendix 1.

4. Limitations

A number of limitations and simplifications were made in order to reach satisfactory and usable results given the page frame of the thesis. In this subsection the major limitations will be described.

The investigated period is from 2006 to 2012. This period was chosen, as data were only available for these years in Bankscope, where most of the financial data was extracted. Further, the time period covers the periods before, during and after the Financial Crisis, which is expected to make the results unbiased towards the Financial Crisis. The added benefit from adding data from, for example, 2003 to 2005 and 2013 is not believed to offset the time it would take to manually extract the data from each banks' annual reports. However, it would have been preferable to include more years in our analyses.

Furthermore, the thesis focuses on European banks, as the focus is on the CRD-IV. Thus, the banks included are European banks, which primarily conduct business and are headquartered in Europe, i.e. banks such as HSBC was removed despite it being headquartered in the UK, because it primarily focus on emerging markets. In addition, all non-publicly traded banks were removed, because the availability of data from non-listed companies is limited. Further, the banks included are G-SIFI or national SIFIs. Thus, the bank sample consists of 25 banks from 12 different European countries. One should understand the conclusions of the thesis within the frame of which the conclusions are reached.

The thesis' primarily focus is on the Tier 1 capital requirements. The requirements will not be analysed any further than what has been in the previous section, as the goal of the thesis is not to understand every aspect of the capital requirements, but, to a higher extent treat the requirements as given. In this thesis, the word '*capital requirements*' will be used as a synonym for Tier 1 capital, as defined in CRD-IV. Further, when the Tier 1 ratio is increased, then it is assumed that equity will increase, as the other capital buffers and additional Tier 1 capital in the Tier 1 capital are assumed constant, i.e. it is assumed that only Core Equity Tier 1 increases. Further, one should notice that Core Tier 1 capital belongs to the shareholders, whereas Additional Tier 1 capital belongs to the debt holders. However, the Additional Tier 1 capital has the loss characteristics of equity. Additionally, the asset composition and quality are assumed constant, when the Tier 1 ratio is increased, which makes an increase in Tier 1 capital equivalent to an increase in equity. These are strict and unrealistic assumptions, as it is not expected to hold in real life. However, the assumptions are necessary in order

to investigate the effect of a higher Tier 1 ratio on banks' valuation.

Furthermore, the thesis will not investigate or interpret the law or the legal mechanisms behind the regulations. Further, the thesis will not analyse the implementation process of CRD-IV in each country. In addition, the thesis will not investigate the solvency requirements, the Net Stable Funding Requirements (NSFR) or the Leverage Ratio requirement. Further, the thesis will not include the European Banking Union or the Single Resolution Mechanism, as it is out of scope.

Lastly, when banks' funding is mentioned, it relates to wholesale funding, i.e. the market funding that banks obtain by issuing debt securities in the market. This is applicable unless otherwise stated. Deposit funding is not included in this thesis as a part of the banks' funding. This is because deposits are not as sensitive to changes in the capital requirements. Additionally, information regarding deposit funding is not publicly available; therefore, it is not possible to calculate the banks' funding costs of deposits. It is a great limitation not to include deposit funding, which makes it important that one understands the results of this thesis, within the frame of which the results are reached.

Many limiting assumptions have been made, some of which limits the ability to generalise the reached conclusions. Thus, it is important to realise that the conclusions will be valid and useful, as long as they are understood, discussed and interpreted within the frame of which they were reached.

5. Methodology

In this thesis, the authors have used both quantitative and qualitative data to achieve both width and depth in the analysis. Width is attractive because it allows the authors to analyse a large number of banks, and depth is preferred because it allows the authors to thoroughly analyse specific relations and connections. Combining the two approaches yields an analysis based on a large sample with indepth analyses. Besides dividing data into quantitative and qualitative data, the sources are also divided into primary and secondary²⁹, and the thesis used both. In all analyses, both quantitative and qualitative data have been used to support and improve the arguments and subsequent conclusions and thereby minimising the influence of a single source.

Before conducting the analysis, it is important to consider how one views the world, as this would influence how information is perceived and interpreted. In this thesis, the authors viewed the world as being positivistic, i.e. the environment is perceived to be realistic and objective³⁰. The authors were thus as objective as possible and only made subjective assumptions where necessary.

5.1 Quantitative Methods

The authors have primarily used quantitative data. However, all quantitative data have been secondary, as the authors have not collected the data themselves. The sources of quantitative data were primarily Bankscope, Bloomberg and Moody's. Bankscope was the primary source of data, for this thesis, as all the banks' financial statements were extracted from this source. As a supplement to Bankscope, financial data from each banks' annual report have also been used whenever it was found necessary. Further, Bloomberg was used to supplement the financial data extracted from Bankscope, as well as to provide stock market returns on banks and the market index. Finally, Moody's was used to extract the banks' credit ratings throughout the time period. The credit ratings were included in the regression in the simple model analysis, as a control variable, thus the credit ratings have influenced the conclusion of the regression analysis.

The quantitative data from Bankscope, Bloomberg and Moody's was also used as inputs in several regression analyses. The regression software STATA was used to run the regressions in the capital requirement analysis concerning the extent of Modigliani & Miller's theory. The regression software

²⁹ Andersen (2008)

³⁰ Heldbjerg (1997)

SAS was used to run the regression in the simple model analysis, in order to determine the relationship between the Tier 1 ratio and funding. Thus, the authors, based on secondary quantitative data, produced the inputs used in these sections.

5.2 Qualitative Methods

Both primary and secondary qualitative data was used in this thesis. The primary qualitative data, used in this thesis, were based on interviews conducted with four different people from the Copenhagen Business School and Nordea respectively. The first interview was with Jesper Rangvid, professor at Copenhagen Business School. He provided a great deal of information on capital requirements and helped set the scene for the thesis by providing usable sources and inputs. The authors held this interview at the very beginning of the process. Moreover, he helped form the foundation as to what was realistic to investigate within the frame of a thesis. The information provided by Rangvid laid the knowledge foundation of the thesis, thus, the information from the interview was used throughout the thesis. The second interview was with Bjørn Alsen³¹, Mark Kandborg³², and Bo Vad Steffensen³³, all from Nordea's treasury group. This interview provided valuable insight into how practitioners view capital requirements, and how Nordea believed capital requirements would affect banks' valuation. The authors had subsequent mail correspondence with Bjørn Alsen, regarding further information on the relationship between capital requirements and banks' valuation. Thus, the simple model in the capital requirement analysis was created in cooperation with Bjørn. Hence, the information provided by Nordea has influenced the analysis, and thus the thesis' conclusions. One should be aware of this, and thereby understand the conclusions of the thesis within the frame of which they were reached.

The authors used secondary qualitative data as well. The secondary sources have been the nonfinancial parts of the annual reports, newspaper articles, journal articles, relevant literature, i.e. books, other Master theses, the Rangvid Report, reports from major consulting firms and transcripts from conference calls. The secondary qualitative data was used throughout the thesis in all analyses, thus the information will affect the conclusions. However, as all sources have been assumed credible, one should not worry about the quality of the conclusions based on biases in the secondary qualitative data.

³¹ Head of Balance Sheet Management, Asset & Liability Management, Group Treasury

³² Executive Director, Asset & Liability Management, Group Treasury

³³ Head of Long-Term Exposures, Group Treasury

5.3 Source Criticism

Using both primary and secondary sources requires the authors to be vigilant and cautious regarding the validity of the sources. Most sources have a certain agenda, which can influence the analyses, and therefore the conclusions. The banks will, for example, want to present themselves as positively as possible in their annual reports. Moreover, reports from the Basel Committee will underline the importance of substantial regulations, and newspapers and journal articles have their own agenda as well. The information provided from these sources is still useable, yet it is important to consider the effects of using subjective sources. Whenever a source was used, the authors were aware of the risk, and therefore used multiple sources in order to minimise the bias risk.

One could criticise the lack of publicly available data used in the thesis. For example, the information provided by Nordea, in the interview, and the data extracted from Bankscope and Bloomberg is not publicly accessible. However, the data from Bankscope and Bloomberg can be accessed through the Copenhagen Business School. Hence, as long as one is affiliated with the Copenhagen Business School, one can access the systems. However, the validity of the conclusions are not expected to be affected by the limited accessibility of some of the data.

Moreover, it is important to consider how the conclusions may have been different, if different sources had been used. For instance, Nordea has been a primary source in clarifying how capital requirements affect banks' financial statements. If other primary sources had been used, then the analysis and the conclusions may have been different. However, the information provided by Nordea has been compared to other secondary sources, for example, journal articles and other theories, in order to make sure the information was correct and not too biased. However, Nordea's view on, for example, the regulations may have affected the conclusions. For instance, Nordea believes that an uneven regulatory playing field exists in Europe, and this could affect the authors' preconceived idea and thereby the thesis' conclusions. Nonetheless, despite using subjective sources, the conclusions are still considered valid, as long as the conclusions are understood and interpreted within the frame of the thesis, its sources and limitations.

6. Theory

Instead of solely describing why certain theories have been used, the chosen theories will be discussed in the context of this thesis. The section is therefore more of a *theoretical discussion* than a descriptive theoretical section. The purpose of this section is to shed light on the applicability of the theories. Firstly, the theories used in the strategic framework analysis will be described, following the models in the financial analysis. Hereafter, the theories used in the capital requirements analysis will be described and discussed. Lastly the models in the valuation analysis will be described.

6.1 Strategic Framework

The purpose of the strategic framework is to analyse the most important elements in the macroenvironment and industry in which the banks operate. *PESTEL* is used to frame how the macroenvironment affect banks' valuation, and to what degree banks can affect their own profitability. *Porter's Five Forces* is used to frame how the industry affects the banks' valuation, and to what degree banks can affect their profitability³⁴. The main focus of the thesis is not a strategic analysis of the banking sector, thus, the analysis will only include the most important factors that are relevant in terms of the research question, which is why it is called a strategic framework. The PESTEL model will therefore only include the Political, the Economical and the Legal factors. Porter's model will only include the bargaining power of buyers, bargaining power of suppliers and internal rivalry. As PESTEL and Porter' Five Forces are assumed to be commonly known only the factors used in this thesis will be described. Thus, for a general interpretation of the models and a thorough walkthrough of all the elements that affect the factors in the models, see Clegg et al. (2011) or Grant (2013).

Both PESTEL and Porter's Five Forces are static, which is a common weakness of the two models³⁵. This reduces their applicability, since the world, within which the banks exist, is dynamic. Furthermore, the two models may not be exhaustive, in the sense that several other external factors may influence the banks' profitability. One could criticise the choice of models, and argue that the analysis would have been more exhaustive and comprehensive had an internal model, such as the SWOT model, been included as well. However, the SWOT model has not been included, as the thesis focuses on the general trends and not bank specific factors.

³⁴ Clegg et al. (2011)

³⁵ Lecture on Business

6.1.1 PESTEL

The PESTEL model is applicable, as it helps to illustrate how the macro-environment affects banks' profitability, as well as frame how legislation affects banks³⁶. Only the most relevant elements in these three factors will be described.

The political factor covers the role of the government and other political bodies³⁷, such as financial authorities, the International Monetary Fund, the European Banking Authority etc., which are extremely important to the banking industry. The analysis will focus on how the political landscape influences the capital requirements. The legal aspect of the capital requirements will not be considered as a part of the political factor, as it will be addressed in the legal factor, as even though the politicians determine the size of the capital requirements it is through legislation that they come into effect.

The economical factor is also essential to banks, as the economic conditions will influence banks' profitability and growth opportunities³⁸. Many elements influence the general economy, yet some are considered more important than others. Only those that are considered important in answering the research question will be analysed, which are the *availability of debt*, *interest rates*, *inflation level* and the growth in *gross domestic product* (GDP). These elements will influence banks' profitability, as they influence banks' opportunities to expand their businesses and to increase profitability on current operations³⁹.

Lastly, the legal factor considers all the elements that induce constrains and changes on businesses due to legislation⁴⁰. The elements in the legal factor are interesting, as regulatory constrains affect the banks' profitability. There are many elements that put constrains on banks, yet, only the capital requirements and depositor insurance will be analysed. This is so, because these two elements are considered to contribute most to the further analyses. Politicians determine the capital requirements, but it is effectuated through legislation, which is why the capital requirements are addressed in this factor.

³⁶ Clegg et al. (2011)

³⁷ Ibid.

³⁸ Ibid.

³⁹ Ibid. 40 Ibid.

6.1.2 Porter's Five Forces

Porter's Five Forces is used to understand the strategic framework surrounding the banks. Only the bargaining power of buyers, bargaining power of suppliers and internal rivalry will be included, as they are the most relevant for the further analyses. However, the other forces, the threat of new entrants and substitute products, are included to some extent in the rivalry force.

Bargaining Power of Buyers

If the product constitutes a large proportion of the overall expenses borne by a buyer, the buyer will be sensitive to price changes, as the price change will influence the buyer's financial situation⁴¹. Furthermore, if the products within an industry offer little differentiation and low switching costs, then the buyer is more likely to switch suppliers based on price⁴². Thus, the buyer will have a higher bargaining power. Buyers are subjected to switching costs, which will act as a counteracting influence on their bargaining power⁴³, i.e. high switching costs lower the buyer's bargaining power.

The size of the relative bargaining power is related to the size and concentration of the related parties⁴⁴. For example, if the buyers are few, concentrated and their purchases are relatively large, then losing one of them is problematic for the bank, i.e. the fewer and more concentrated buyers are, the more relative bargaining power the buyers will have⁴⁵. Moreover, the size of the business brought to the bank, i.e. combining mortgage, checking and savings accounts, insurance, pension schemes etc. within the same bank, can lead to a higher bargaining power of the buyer⁴⁶.

It is important to realize that no one factor will determine buyers bargaining power, but it is a combination of several factors.

Bargaining Power of Suppliers

Unlike other industries, the buyers in the banking industry are often also the suppliers. It is furthermore important to distinguish between deposit suppliers, such as simple depositors who deposit their salaries in the bank, and wholesale suppliers, such as institutional investor who purchase bonds issued by the banks.

⁴¹ Clegg et al. (2011)

⁴² Ibid.

⁴³ Ibid. 44 Grant (2013)

⁴⁵ Ibid.

⁴⁶ Nordea II

When analysing the bargaining power of suppliers, two central elements influence the bargaining power: how easily the bank can switch suppliers and the relative bargaining power of involved parties⁴⁷. Banks' primary input is capital, and both deposit suppliers and wholesale suppliers supply the capital⁴⁸. Thus, whether the capital is differentiated will affect the bargaining power of suppliers⁴⁹. Further, the size of the relative bargaining power is related to the concentration of the suppliers⁵⁰. Banks might not be dependent on a single depositor supplier, but if all the depositors withdrew their deposits then the bank would have liquidity problems. Thus, the necessity of the supplied capital affects the banks' bargaining power.

No single element will determine the bargaining power of suppliers, but it is the collective influence of many elements.

Internal Rivalry

The degree of competition plays an important role in determining the profitability of the banks within the industry⁵¹. The degree of competition affects how banks compete, for example, whether banks compete on prices or on other non-price dimensions such as advertisement, innovation, convenience, trust etc.⁵². The number and size of competing banks determine the concentration factor, i.e. the degree of competition⁵³. There are several ways to determine the concentration within an industry, yet in this thesis, the *Herfindahl-Hirschman index* is used. The concentration of companies within an industry is, to a large degree, also affected by the speed with which new competitors enter the industry⁵⁴. In an industry, where the entry barriers are high, new potential competitors cannot freely enter the industry, due to amongst others economies of scale⁵⁵.

The degree of diversification of competitors is another factor that influence the industrial competition⁵⁶. If industry contenders are alike in terms of their background, product, goals, cost structure and strategies, they are more likely to have severe price competition, because they will have

- 49 Investopedia XI 50 Grant (2013)
- 51 Ibid.
- 52 Ibid.
- 53 Ibid.

55 Ibid.

⁴⁷ Grant (2013)

⁴⁸ Deutsche Bundesbank

⁵⁴ Clegg et al. (2011)

⁵⁶ Ibid.

difficulties in differentiating from one another⁵⁷. Furthermore, low product differentiation will normally lead to customers being more willing to switch between products, but high switching costs, which are considered to be significant in the banking industry, will diminish this trend, and this element is therefore considered to be a contributing factor to the overall internal rivalry⁵⁸.

The strategic framework can now be used to analyse how the macro-environment and the banking industry affects the banks' profitability, and to what degree banks can affect these factors. Thus, it is now interesting to understand what drives the banks' profitability.

6.2 Financial Analysis

The *DuPont model* is often used when determining a company's profitability⁵⁹. However, the original DuPont model is not applicable to banks, as, for example, return on operations, asset turnover and return on financial activities is not relevant for banks' valuation⁶⁰. Furthermore, the DuPont model requires that one can distinguish between a company's operations and finances⁶¹, which are difficult for a financial company where financing and operations are interdependent. Thus, a modified version of the DuPont model will be used. Hence, this profitability analysis will focus on *the net interest income, the cost-to-income ratio, loan loss impairment, the leverage ratio* and lastly *the return on equity*⁶². These value drivers were chosen as they are often used when valuing banks' profitability⁶³. The balance sheet value drivers, such as total assets, loans and equity, will be analysed in the capital requirement section. The main purpose of the financial analysis is to understand what drives the profitability of banks, what affects the banks' financial value drivers and to use the knowledge in the valuation section.

6.2.1 Net Interest Income

The net interest income (NII) is one of the most important value drivers for banks, as profiting on the difference between the lending and borrowing rate is essentially how a bank makes money⁶⁴. Thus, the ratio shows how successfully a bank can profit from its core activity, which has a direct effect on its valuation. This value driver is affected by factors that affect a bank's interest income and interest

60 Damodaran I 61 Ross et al. (2008)

⁵⁷ Grant (2013)

⁵⁸ Ibid.

⁵⁹ Sørensen (2009)

⁶² Damodaran I, Beitel et al. (2011) & Aagaard (2009)

⁶³ Beitel et al. (2011)

⁶⁴ Investopedia I

expenses, for example, GDP, interest rate fluctuations, availability of debt and perhaps the new capital requirements⁶⁵. A recession might lead to people being more careful and not lending as much, which could cause the interest income to decrease⁶⁶. A low-interest environment could lead to lower interest income, as the banks might not be able to demand as high a lending rate, as before the low-interest environment went into effect⁶⁷. On the other hand, a low-interest environment might cause the borrowing rate to decrease too, which would cause the NII to increase. Additionally, the capital requirements might affect NII as well, if the banks choose to trim its balance to meet the new requirements. Further, the bargaining power of buyers could affect NII, as the bargaining power might affect whether banks can influence the lending rate, which affects the net interest margin, given the same borrowing rate. A high ratio is preferable, as the bank then is

successful in profiting on its core activities.

The formula for the value driver is, *Interest Income – Interest Expense*.

6.2.2 Cost-to-Income Ratio

This is an important factor in determining firms' profitability, as the ratio indicates how well banks can control their expenses in relation to their income⁶⁸. Hence, it shows how efficient the banks are in delivering value to their investors⁶⁹. The lower the ratio the better, because the bank then earns more on its services than it cost to deliver them. However, one should be aware that the ratio does not explain why a bank, for example, has high costs relative to income. The ratio is affected by all factors influencing a bank's income and expenses, such as the economy, interest levels, availability of debt, competition in the industry and the cost side of the banks' business models⁷⁰. One should be aware that some external factors affect all the banks, and some factors will just affect one or some of the banks.

This value-driver was calculated using this formula $\frac{Operational \ Income_t}{Operational \ Expenses_t}$

6.2.3 Loan Loss Impairment

It has previously been stated that banks profit on borrowing and lending money. Whenever one lends money, there is a risk of not getting the money back, i.e. loan loss. The banks' profitability is sensitive

⁶⁵ English (2002)

⁶⁶ Rangvid (2013) 67 Wall Street Journal I

⁶⁸ MoneyWeek I

⁶⁹ Aagaard (2009)

⁷⁰ MoneyWeek I

to loan losses, as the higher the loan loss, the lower the profit. Loan loss impairments illustrate how much the bank believes it will have to forego because of loan losses⁷¹. The lower the loan loss impairments the better, because that shows the banks, all else equal, have fewer loan losses. The level of real wages, GDP and the bank's business model, i.e. in terms of its lending policies, can affect the value driver⁷². For example, if real wages decrease, then the customers might find it difficult to pay the interest on the loan, which might results in higher loss impairments. High loan loss impairments could indicate that the bank takes on risky projects and investments, which can make earnings volatile, which will affect the bank's valuation⁷³. However, one should be aware that the figure is sensitive to other external factors as well. This figure was extracted from Bankscope.

6.2.4 Leverage Ratio

The leverage ratio is highly relevant when analysing the banks' valuation and capital requirements, as it indicates how leveraged the banks have been over the time period. The higher the ratio the less leveraged the bank is. A bank that has a low leverage ratio might be more profitable, as the bank then is able to lend more⁷⁴. The more a bank lends, the more the bank can earn, ceteris paribus. Furthermore, it is interesting to see if the leverage ratio has increased or decreased over the years, in line with the changes in the capital requirements. The equation for the leverage ratio used in the financial analysis is: $\frac{Equity_t}{Total Assets_t}$.

It is evident that the leverage ratio is influenced by a number of factors, but is mostly affected by the capital requirements and the banks' business models. Banks can to some degree decide on their level of leverage, however, the new capital requirements have imposed a minimum level of leverage. Thus, the ratio also indicates how risk seeking a bank is, because leverage is a liability to the bank⁷⁵, which can influence the amount of loan loss impairments and NII, and thereby the value of the bank.

6.2.5 Return on Equity

The return on equity (ROE) indicates how well a bank earns a return on its equity. The higher the ROE the better, as the bank then is capable of earning a higher profit and thereby a higher return on

⁷¹ Deloitte

⁷² Federal Reserve Bank of St. Louis I

⁷³ Duke Faculty Paper

⁷⁴ BusinessDictionary

⁷⁵ Berk & DeMarzo (2011)

the capital provided by its shareholders⁷⁶, which will influence the valuation positively. ROE is applicable to banks, as it allows financing to be a source of value-creation, as the ratio only uses profit and equity⁷⁷. Furthermore, the four other value-drivers, i.e. NII, cost-to-income ratio, loan loss impairments and leverage ratio, as well as GDP, the interest level, the capital requirements and the banks' business models influences ROE⁷⁸. The limitation of using ROE is that the ratio is relative, thus, one has to compare the ratio against historical values or compare them with peers. Another limitation of ROE is that the value can be manipulated with, as it is calculated using accounting figures⁷⁹. For example, a bank can choose to write down a loan, which will decrease earnings, but a bank can also choose to write down the loan later, which will lead to earnings being artificially high, thus, showing an artificially high ROE.

ROE is calculated by using the following formula = $\frac{Total \ Earnings_t}{Total \ Equity_t}$

The above sections have described the value drivers, clarified how they affect the banks' profitability and what factors might affect the value drivers. Thus, it is now interesting to understand the theories behind capital structure, and clarify how capital structure could, theoretically, affect banks' valuation.

6.3 Capital Structure

The capital structure of banks is the essence of this thesis, as the primary focus is on valuation and the new capital requirements. Given the research question of this thesis, it is important to understand how the capital requirements affect the banks' capital structure and thereby banks' valuation. Modigliani and Miller's (M&M) theory on capital structure is one of the most important theories, and the basis for all new views on capital structure⁸⁰. Hence, M&M is this thesis' starting point as well when analysing the effects of changes in capital structure. Since M&M's theorem is a ground pillar in corporate finance, it is expected that the reader is familiar with the theory. Thus, the basic descriptions of propositions I and II will not be conducted in depth in this thesis, however, for a detailed walkthrough see Berk & DeMarzo (2011). Thus, the following section will focus on the limitations of M&M's theorem, and why the theorem might be challenged in a real-life setting. Hence, applying M&M's theorem to a more real-life setting will be discussed, as this will influence the answer of the research question.

⁷⁶ Berk & DeMarzo (2011)

⁷⁷ Damodaran I 78 UIC – ROE

⁷⁸ UIC – ROE 79 Investopedia II

⁸⁰ Berk & DeMarzo (2011)

6.3.1 Modigliani and Miller's Theorem

6.3.1.1 Modigliani and Miller Proposition I

M&M's first proposition states that in a perfect capital market "*the value of the firm is independent of the firm's capital structure*" (Ross et al. (2008), p. 558). As mentioned above, this thesis will not describe the basics of this theorem, thus, the rest of this subsection discusses the limitations of the theorem.

As stated, this proposition only holds in a perfect capital market. The assumption behind the proposition is that the economy is in a perfect capital market setting, i.e. no taxes, transaction costs, issuance costs nor unfairly priced securities, and a firm's financing decision does not affect the cash flow generated⁸¹. If the assumption of no transaction costs and no arbitrage holds, then that would indicate that banks are superfluous, and that there are no economies of scale in borrowing⁸². The assumptions are unrealistic as there are market imperfections in the real world. Furthermore, there are two major implications with this proposition. Firstly, it assumes that the value of the firm is independent of the capital structure, and secondly that the *weighted average cost of capital* (WACC) is independent of the amount of debt and equity⁸³. Rangvid (2013) argues that the cost of equity is higher than the cost of debt, due to the higher risk involved with equity. Thus, the less leveraged a bank becomes the higher is its WACC⁸⁴. Hence, Rangvid does not believe that the two effects will cancel each other out, as M&M believes. Further, Rangvid (2013) argues that the return on each dollar of equity decreases when a firm becomes less leveraged, as the risk is now spread out amongst more equity providers. Rangvid (2013) moreover argues that M&M might not apply to financial companies, as their theory is based on many critical assumptions, and if these are not all met, less leverage might increase firms' total cost of capital. If this is true then banks might try and increase their lending rates to cover the increase in capital costs. Kashyap et al. (2010) finds that if the capital ratio increases, i.e. a decrease in leverage, then banks' loan rates will increase with 2.5 to 4.5 basis points when the Tier 1 ratio is increased with 1%. This could very well have a negative effect on economic growth⁸⁵.

⁸¹ Berk and DeMarzo (2011)

⁸² Søndergaard (2005)

⁸³ Ross et al. (2008)

⁸⁴ Rangvid (2013) 85 Ibid.

When taxes are taking into consideration, the interest paid on debt is tax deductible, which creates a benefit to debt financing. This leads to the WACC decreasing when the firm has more debt, due to the interest tax shield, which increases the value of the firm⁸⁶. A change in the capital structure now has an effect on the firm's cash flow, as the cash flow to the levered firm is now higher, due to the interest tax shield, than the cash flow to the unlevered firm⁸⁷. Thus, the value of the leveraged company is the cash flows from the assets plus the present value of the interest tax shield.

Nonetheless, there are still implications with Proposition I with taxes, as M&M discount the tax shield with the required rate of return of debt holders, which means that M&M believes that the risk of the tax shield is the same as debt. This is not true thus M&M overestimates the value of the tax shield⁸⁸. One should also notice that the benefit of the tax shield is dependent on the firm generating a positive profit. Furthermore, banks borrow money in order to lend them out at a higher interest rate. Banks use more leverage than non-financial firms, as their core business is to transform debt into assets. Even banks, that would theoretical benefit from having the most leveraged capital structure as possible, do not have more benefits than costs from such a capital structure in real life. The new capital requirements are forcing banks to deleverage, because it is believed that banks are too leveraged⁸⁹. The fact that even banks can be too leveraged, shows the limitation of M&M's conclusions and how one cannot directly apply M&M's conclusions to real life. Having a capital structure of 100% debt is not optimal, as M&M does not, among others, consider financial distress costs, transaction costs, personal tax implications and dividend policies. Hence, one should be critical to the applicability of Proposition I in real-life.

6.3.1.2 Modigliani and Miller Proposition II

M&M's proposition II states "*that a firm's cost of equity is a positive linear function of the firm's capital structure*" (Ross et al. (2008), p. 559). This means that a change in the bank's capital structure will not alter the value of the bank, but it will change the bank's cost of debt and equity. Again, a detailed description of Proposition II will not be conducted here. Instead, this subsection will focus on the implications of M&M's proposition.

⁸⁶ Berk & DeMarzo (2011)

⁸⁷ Ross et al. (2008)

⁸⁸ Søndergaard (2005)

⁸⁹ Rangvid (2013)

There are a number of critics of the M&M theory. One of these critiques is that one could argue that leverage increases earnings per share (EPS), thus, the bank's stock price⁹⁰. More leverage decreases earnings, as more interest is paid on debt. However, the more debt will lead to fewer shares outstanding, thus, EPS increases, as you divide earnings with fewer shares⁹¹. However, M&M argues that more leverage does not increase EPS, as the cost of equity will increase with more leverage, due to higher risk, and the effects will cancel each other out⁹². Another critique of M&M is the dilution of shareholder's ownership. It can be argued that issuing new equity will dilute current shareholder's ownership, as the profits generated will be split over more shares, which will reduce the value of each share⁹³. Thus, one could argue that debt financing should be used instead when raising new capital. However, M&M argues that the new equity raised will increase the firm's assets and the effects cancel each other out⁹⁴. Another criticism is that M&M argues that investors can create their own leverage, i.e. homemade leverage, by individually lending or borrowing to create their own most optimal capital structure⁹⁵. However, one extensive assumption M&M makes is that investors can borrow and lend at the same interest rates, as the company can, which is not a fair assumption, at least not when using banks as an example. As a bank's core business is to lend and borrow to and from the public, it can be assumed that banks are able to borrow cheaper than their customers can. Furthermore, M&M does not mention the possibility of asymmetric information, which makes it difficult to compare whether or not banks and investors lends and borrows at the same rates.

When taxes are introduced, the cost of equity will still increase with leverage, however, the return on equity is now dependent on the unlevered cost of capital, the debt-to-equity ratio, the cost of debt and tax⁹⁶. The value of the firm is now equal to the value of an unlevered firm plus the present value of the tax shield. Based on these arguments, one could argue that the optimal level of leverage is where the interest paid on debt is equal to the earnings before interest and tax, because the firm then does not have to pay taxes at all. However, the firm would then also be in financial distress, which carries a lot of costs and risk⁹⁷. The same implications, as stated above, apply to Proposition II with taxes. Further, it is assumed that the cost of debt is risk-free, which is an unrealistic assumption. Based on the volatility in the banking industry, it is not fair to assume that bank' debt is risk-free because banks'

- 91 Ibid.
- 92 Ibid. 93 Ibid.
- 94 Ibid.
- 95 Ibid
- 96 Ross et al. (2008)

⁹⁰ Berk & DeMarzo (2011)

⁹⁷ Berk & DeMarzo (2011)

cash flows can be reduced quickly and dramatically during a downturn. Due to bankruptcies, most debt comes with a risk premium. The essence of M&M's theory is that they believe that financial transactions does not destroy nor add value, but financial decisions is more a repackaging of risk⁹⁸. This might be theoretical correct, but not correct in real life, since businesses in the real world are subject to taxes, transaction costs, financial distress costs etc. Thus, businesses do get added value from financial transactions, contrary to the perfect capital markets in the world of M&M.

6.3.2 Discussion of Capital Structure

There are some major fallacies concerning the M&M theorem, for example, the lack of consideration for the implication of personal tax, dividend policy, ownership considerations, heterogeneous risk profiles and asymmetric information. These will not be discussed in detail, as they are not highly relevant in terms of the research question. The lack of consideration for these implications must make one question whether or not M&M's propositions hold in real life or at least to which extent.

The *static theory model* states that firms will increase their leverage ratio up to the point where the benefit of more debt exactly offsets the financial distress costs⁹⁹, i.e. where the value of the firm is maximized. The most significant difference between this theory and M&M with taxes is that the static model takes the reduction in value from financial distress costs into consideration, which makes the static model seem more realistic. Based on the static theory model it would be assumed that when the new capital requirements are introduced, the value of some of the banks might increase, as leverage decreases.

An alternative to the static theory model is the *pecking-order theory*. The pecking-order theory states that firms prefer to use the cheapest financing option first, as all types of financing are not equally expensive¹⁰⁰. The theory states that internal financing, i.e. retained earnings, is the cheapest, then debt financing and the most expensive financing option is equity. However, one can also use the theory to try to explain what banks will do when they have to decrease their leverage. In order to increase the Tier 1 ratio, banks can issue new equity, trim the balance sheet or increase earnings, i.e. increase the amount of retained earnings if no dividend is paid.

Based on the pecking order theory banks are advised not to have a lot of equity, and if they were to

⁹⁸ Berk & DeMarzo (2011)99 Ross et al. (2008)100 Ibid.

increase their equity ratio then to do so by accumulating retained earnings¹⁰¹. Kashyap et al. (2010) even goes so far to saying that it is better for a bank, when wishing to increase the equity ratio, not to take on an investment than to issue new equity to finance the investment, i.e. restraint is better than expansion.

Secondly, banks can reduce their lending, and thus trim their balance sheet. Some banks have decreased their balance over recent years; however, it is difficult to distinguish if this is due to the negative loan growth, because of the Financial Crisis, or due to the new capital requirements¹⁰². Deutsche Bank, Barclays and Crédit Agricole have, among others, stated that they would decrease their balance with 20% in order to increase their capital ratio, due to the new capital requirements. Decreasing the balance is a short-term solution, as the banks forego future earnings to increase their equity ratio¹⁰³. Furthermore, it has been shown that banks in recent years have been increasing their amount of low-risk assets and decreasing their amount of high-risk assets¹⁰⁴. This is another way of restructuring the balance, so the reported Core Tier 1 ratio can increase. Even Kashyap et al. (2010) argues that banks will trim their balance or at least redesign their loan portfolio to reach the new capital ratio.

Based on empirical data and theoretical models it seems that banks prefer to increase their equity ratio using retained earnings. Kashyap et al. (2010) argues that if banks were given longer time to adjust to the new requirements, banks would increase the ratio by accumulating more retained earnings. It is the cheapest and most sufficient long-term solution for banks, however, it requires banks have positive earnings, which might not be a obvious in the time period from 2006 to 2012.

Some scholars believe that banks should be less leveraged, and others believe that banks should be allowed to be as leveraged as they wish. Admati et.al. (2011), Raaballe (2013) and Admati & Hellwig (2013) argues that banks should be less leveraged as the cost, associated with being less leveraged, is not significant to banks, but the cost of future financial crises is significant to the societies¹⁰⁵. They argue that less leverage will not increase the banks' total cost of capital, i.e. they agree with M&M. Their reasoning is that most significant financial institutions are *"too big to fail"*, which means that

¹⁰¹ Kashyap et al. (2010)

¹⁰² Raaballe (2013)

¹⁰³ Ibid.

¹⁰⁴ Ibid.

¹⁰⁵ Rangvid (2013)

the governments will not let the institutions go bankrupt, as the consequences of such would be too severe¹⁰⁶. Hence, there is no downfall for banks in taking on too much risk, as the governments will aid the banks if needed. Therefore, it is assumed that banks have an implicit guarantee from the governments¹⁰⁷, i.e. the market forces are put out of action. As the banks are already perceived as safe, then less leverage will not decrease the cost of equity, hence, it is believed that WACC will not increase. Admati & Hellwig (2013) argues that even if the total cost of capital increases, as the banks become less leveraged, then the value to the society increases as the implicit government guarantee decreases, as the banks no longer need the same guarantee as their probability of bankruptcy decreases. On the other hand, scholars forget that the implicit government guarantee reduces the risk premium of deposits, which benefits the customer, i.e. the society, as this premium might increase if the guarantee disappears¹⁰⁸.

As the above scholars argues for less leveraged banks, they implicitly argue in favour of the new capital requirements, as it will decrease the leverage of banks. They believe that the value of the banks, with less leverage, will stay unchanged or decrease slightly, but they argue that it will still be better for the society as a whole. Calculating the benefits of a more robust financial market with less uncertainty is difficult, but the cost of the Financial Crisis is significant, as it is estimated to be around 10% of GDP¹⁰⁹.

On the other hand, there are also scholars that do not argue in favour for less leveraged banks, as they believe that the total costs to banks will be higher than the total benefit to society. Baker & Wurgler (2013) show that banks' systemic risk decreases with less leverage, however, the required return on equity does not decrease proportionally as it should¹¹⁰. Thus, they believe that less leverage increases the total cost of capital, as markets are not perfect. Douglas & Rajan (2000)¹¹¹ have empirically shown that less leveraged banks find it difficult to create adequate liquidity. Banks profits on transforming short-term deposits into long-term lending, i.e. transforming liquidity, and thereby provides financing to companies, which will create economic growth¹¹². Even through less leveraged banks can create more certain and robust financial institutions, the overall costs to the economy might be higher, as it

- 107 Ibid.
- 108 Søndergaard (2005)
- 109 Miles et al. (2012) 110 Rangvid (2013)

¹⁰⁶ Rangvid (2013)

¹¹¹ Cited in Diamond & Rajan (2000)

¹¹² Rangvid (2013)

might make investments difficult to finance, i.e. limit economic growth. DeAngelo & Stulz (2013) argues that, even if all the assumptions in M&M holds, then the requirements of more equity might reduce the financial liquidity creation in society, which might create a non-optimal capital structure for banks with too little leverage.

Kashyap et al. (2010) argues that higher equity requirements can be the breeding ground for the new "shadow banking" sector. The already existing banks have a disadvantage in terms of the new capital requirements, which might create a different type of competition. The new "shadow banking" sector does not fall within the strict regulations that the banks' face, as they are not traditional banks¹¹³. Thus, the already existing banks might be more robust, however, the stability of the overall financial system might be as uncertain as it was before the Financial Crisis, if the highly leveraged and risk seeking investors still exist simply under a new name: "shadow banking"¹¹⁴.

Most people agree that the capital requirements to banks, before the Financial Crisis, were too low. Thus, banks should be deleveraged compared to the level in 2007¹¹⁵. Scholars are concerned with banks being too high or too low leveraged. Thus, agreeing on the 'right' capital requirements can be difficult, as nobody exactly knows what will happen when new capital requirements are put into practise. The different theories and views on capital structure have now been discussed and form the basis for the empirical analyses later in the thesis. As one now understands how the capital structure should affect banks' valuation, it is now interesting to understand the valuation methods that will be used in the thesis.

6.4 Valuation

Valuations are the main focus of this thesis, however, not in a traditional way. The purpose of using valuation models is not to come as close as possible to the banks 'actual' values, but to a greater extent be able to change the inputs in the models, in a simplified way, to see the results of a hypothetical increase in the Tier 1 ratio, in the scenario analysis. This thesis uses *the price-earnings ratio* and *the market-to-book ratio* as valuation models for valuing the sample banks. Banks are difficult to value, as there are many valuation models that cannot be used on banks, as they ignore

¹¹³ Kashyap et al. (2010)

¹¹⁴ Ibid.

¹¹⁵ Rangvid (2013)

the fact that financing can create value for banks¹¹⁶. The two models are used, as they are often used when valuing financial firms¹¹⁷ and require few subjective assumptions, compared to other valuation models. Other valuation models, such as the free cash flow to equity model, the dividend discount model and the excess return model could have been included. However, these models were not included because they require explicit estimation of future cash flows, future reinvestments and valuing the loan portfolios, which require many subjective assumptions. Further, they are too extensive to conduct on twenty-five banks within the page frame of this thesis. In addition, they are too complex to use in the scenario analysis, when the effect of a higher Tier 1 ratio on banks' valuation is investigated. Thus, the two above mentioned valuation models are chosen, as they are useful for valuing banks and suitable for the scenario analysis.

6.4.1 Price-Earnings Ratio

The price-earnings ratio (P/E) is a relative ratio, thus, one cannot conclude anything based on a single ratio, but one has to compare the ratio to historical values or to a peer group in order to comment on the ratio¹¹⁸. The forward P/E ratio was used to incorporate investors' future earnings expectations to the banks, i.e. the ratio indicates how much investors are willing to pay for future earnings¹¹⁹. The forward P/E ratio is calculated as follows $\frac{Price \ per \ share_t}{Estimated \ earnings \ per \ share_{t+1}}$

The P/E ratio is a commonly used valuation model, thus, the basic interpretation of the model will not be conducted here; see Berk & DeMarzo (2011) for a comprehensive walkthrough.

Limited information is needed to calculate the ratio, and no subjective assumptions have to be made, which is preferable, since the goal is to be as objective as possible. Estimated earnings per share and the market prices will be extracted from Bloomberg. However, the disadvantage of using the share price is that one then has to assume that the market has priced the stock 'correctly'¹²¹, which is nevertheless a realistic assumption. Thus, it is a doubled-edged sword, since the ratio is not entrenched in fundamental information but is dependent of the market's valuation. Lastly, estimated earnings per share is a subjective figure, which could influence the results. However, the average consensus estimate can be used to mitigate one analysts' subjectivity. Thus, the forward P/E ratio was

118 Sørensen (2009)

119 Ross et al. (2008) 120 Ibid.

¹¹⁶ Damodaran I

¹¹⁷ Ibid.

¹²¹ Sørensen (2009)

not calculated based on any subjective assumptions, but rather on publically available information, i.e. the consensus earnings per share estimates and the share price. This is perceived to increase the robustness of the results.

6.4.2 Market-to-Book Ratio

The market-to-book ratio (M/B) is also a relative valuation model, which indicates that one cannot comment on the value of the ratio without comparing the ratios across the peer group or to historical values. A modified version of the original model was used, in order to capture investors' expectations. A forward M/B ratio was therefore used, and was calculated using the following formula, $\frac{market \ value \ of \ equity_t}{Forward \ book \ value \ of \ equity_{t+1}}$ 122.

As with the P/E ratio, the M/B ratio is considered widely known, and the basic interpretation of the ratio will therefore not be conducted here. See Berk & DeMarzo (2011) for a comprehensive walkthrough.

The market value of equity is the banks' market capitalisation, which can be extracted from, for example, Bloomberg. However, the forward book value of equity cannot be extracted as easily, but has to be calculated. It consists of the banks' current book value of equity, which can be extracted from Bankscope, and the retained earnings based on the consensus earnings per share estimates, which can be extracted from Bloomberg. The size of retained earnings can be found by multiplying the estimated earnings with the retained earnings ratio, i.e. one minus the dividend payout ratio. Hence, the forward book value of equity can be found by using the current book value of equity and estimated retained earnings.

As with the P/E ratio, this ratio is dependent on the market's valuation of the bank, which again can create noise in the valuation, if the market has not valued the banks "correctly". However, on a positive note the M/B ratio in fundamentally rooted, as the book value of equity is included in the ratio. Further, the M/B ratio depends on accounting principles, as the book value of equity is an accounting measurement. Therefore, the ratio is sensitive to different estimations of equity. Thus, some of the banks might have a too high or too low ratio compared to their peers. For example, if the market has not valued the bank "correctly", or if the bank has included too many elements in its equity, that should not have been included. However, it is a fair assumption to make that the market

¹²² Berk & DeMarzo (2011)

values the banks correctly and that the banks have estimated their amount of equity correctly. The most significant difference between the forward P/E ratio and the forward M/B ratio is that a bank with negatively estimated earnings will not have a forward P/E ratio but can have a forward M/B ratio. This makes the M/B ratio more stable and informative to use over this thesis' time period¹²³. In addition, it is more difficult for the banks to manipulate the M/B ratio, as banks cannot easily alter their market valuation or book value of equity. However, the M/B ratio is more sensitive to changes in the capital structure, which might affect the results.

One is now familiar with the models and theories that will be used in the thesis. Thus, a great starting point for the analyses has been developed.

¹²³ Dermine (2009)

7. Analysis

The analyses will take place in the following sections. The analyses are based on the theoretical frameworks discussed in the above sections. Each of the different analyses will lead to a subconclusion, where the sub questions will be answered. Firstly the strategic framework analysis will be conducted, which is followed by the financial analysis. Then the analysis of the capital requirements will take place, which will firstly analyse the extent of Modigliani & Miller's theorem and secondly analyse how the Tier 1 ratio affects the banks' financial statements, through a simple model analysis. Lastly, the valuation analysis will take place. This analysis will begin with a relative valuation of the banks then a discussion of the limitations using these valuation models will take place. This creates the starting point for the scenario, which is the final part in the valuation analysis, where the effect of a hypothetical increase in the Tier 1 ratio is established on the banks' valuations.

7.1 Strategic Framework

In the following two sections, the banks' relevant external environment will be analysed and investigated, and the results will be used in the following financial analysis. The objective of the strategic framework is not to conduct a full strategic analysis, but focus on the most relevant elements that determine to what extent banks can affect their own profitability, and the degree of industrial rivalry. The strategic framework will set the scene for the subsequent analyses, and is included as it explains trends and results seen in the rest of the analyses.

7.1.1 PESTEL

The banks' macro-environment is analysed by using the PESTEL framework, as described in section 6.1.1.

Political

Because of the impact of the Financial Crisis, many governments, in the western world, took extensive measures, such as providing government guarantees for the financial sector, offering capital and extraordinary liquidity measures and acquiring and liquidating distressed banks in order to sustain financial stability again¹²⁴. The reason why the governments took these extensive measures is because the banking industry plays a systemic important role in the economy and society¹²⁵.

¹²⁴ Rangvid (2013)

¹²⁵ Ungureanu (2008)

Politicians have reached the conclusion that the capital requirements have to increase to ensure banks are not able to take measures that make them highly sensitive to defaults of borrowers and sudden economic changes¹²⁶. Some believe that these requirements are necessary, while others believe that they are limiting the growth potential of banks¹²⁷. The fact is banks are faced with substantially more regulation than they were before the Financial Crisis¹²⁸. The recent years tightening in bank regulations come after a decade-long period of liberalisation in bank regulations, where politicians believed that liberalising the banking industry would induce more economic growth, contrary to the trend amongst most politicians today¹²⁹.

The political landscape affects the legislation that banks are subjected to, and due to public concern and accusations over recent years, banks have come under increasing scrutiny, which has led to strict regulation¹³⁰. This indicates that banks are subjected to the legislation and restrictions the current politicians are conceived by. However, as banks are systemically important to the societies and the costs of the Financial Crisis was estimated to be around 10% of GDP¹³¹ it is not unreasonable that politicians would want to impose stricter regulations on banks.

Based on the above, it seems as if higher capital requirements narrow the freedom of the banks. Thus, the political factor sets the frame within which banks can operate. Politicians can therefore greatly determine the banks' ability to profit. The political factor is affected by what is perceived as being correct in the societies and by economical factors, as the Financial Crisis affected the politicians to increase capital requirements. It therefore seems that banks can to no extent influence this factor.

Economical

Another important factor that influence the value of banks is the economical factor, which includes, amongst other, the availability of debt, the interest rate level and the GDP growth rate. These elements serve as the basis for the potential profitability of banks, as banks are more likely to be profitable if

¹²⁶ Wall Street Journal III

¹²⁷ Rangvid (2013) 128 Financial Times I

¹²⁹ Rangvid (2013)

¹³⁰ Financial Times II

¹³¹ Miles et al. (2012)

the interest rate level and GDP growth rates are high, compared to a situation where the economy is in a recession¹³². Thus, the economical factor sets the limits on the banks ability to be profitable¹³³.

Banks rely on the availability of funding options, i.e. the availability of debt, as it is used in the banks' daily core business activities¹³⁴. Debt is, according to economic theory, cheaper than equity because debt holders are senior to equity holders in the event of default¹³⁵. This means that it is often cheaper for companies to use debt than equity when funding operations, and this is especially true for banks, which rely mostly on debt funding¹³⁶. The availability of debt will, amongst other, depend on the credit rating of banks, as banks with a good credit rating will find debt funding more accessible and cheaper, but for banks with an undesirable credit ratings, it might be difficult to raise funds¹³⁷. The graph in appendix 2 shows that the European banks in the period 2000-2012 have net issued debt to the market, which means that they have issued more debt than what has matured each year. Thus, the size of the debt market has increased substantially over the years, which has made it easier for banks to borrow money, as the investors have demanded it. From this follows, that debt is widely available to banks, if the banks have the repayment capacity, i.e. a high credit rating. Thus, banks with a low credit rating, may find it difficulty to raising debt¹³⁸.

Based on the figure below, figure 2, it is evident that the interest rates have fluctuated over time, and that the economy is currently in a low-interest level environment.

134 Danske Bank I 135 Berk & DeMarzo (2011)

¹³² Bolt et al. (2012)

¹³³ Ibid.

¹³⁶ See appendix 4 for chart over debt/equity relation

¹³⁷ Visalli et al. (2011)

¹³⁸ Rixtel & Gasperini (2013)
Figure 2: ECB Main Interest Rate



Source: ECB VII

The main refinancing rate is often used as the reference rate, as it is the primary measure used to control for liquidity in the banking sector through repurchase agreements, where banks put up collateral and in return receives a cash-loan¹³⁹. Thus, this interest rate is the one that European banks' are faced with when lending and borrowing in ECB. The interest rate is low in 2012, thus, indicating a current low interest rate level. The low interest rate level has a substantial effect on the business conducted by banks, as the interest rate level affects the lending and borrowing rates faced by banks and thereby the banks' customers¹⁴⁰. It is cheaper for banks to borrow money in a low-interest environment, than in a high-interest environment. However, the banks may also receive less interest on the money they lend, due to lower lending rates, and at the same time might lend less to customers, which both affects bank's profitability negatively¹⁴¹. On the other hand, the low-interest environment also provides cheaper funding opportunities for banks, which reduces their interest expenses, yet the overall effect of lower interest rates seems to be that banks' profit declines¹⁴².

Lastly, the economical effects of the Financial Crisis were many and significant, including an increase in unemployment, a decrease in housing prices, an increase in sovereign debt and low GDP growth¹⁴³. Even though more than seven years have passed since the Financial Crisis, many countries still

¹³⁹ ECB III

¹⁴⁰ Maudos (2003)

¹⁴¹ Finanswatch I

¹⁴² Wall Street Journal I 143 Rangvid (2013)

experience an absolute fall in their GDP, as compared with before the Financial Crisis¹⁴⁴. From the following figure, one can see the average development in GDP for 28 European countries.



Figure 3: Average GDP, Europe

Source: Eurostat – GDP Index in Europe

From the above figure, it is evident that GDP fell during the Financial Crisis from 2008 to 2009, but thereafter increased slowing again. There are many factors affecting the GDP development, however, from the above figure it is clear that the Financial Crisis had a large impact on GDP. From the graph in appendix 3, one can see that there have been substantially differences in the GDP development in the different countries in the sample. For example, Sweden has had substantial growth in GDP, while South-European countries such as Spain and Italy have had declining GDP growth since the outburst of the Financial Crisis in 2008. As Swedish, Spanish and Italian banks have been exposed to different economic conditions, it is not unreasonable to assume that these differences will show in the subsequent financial analysis.

The real wage level and the inflation level also affect GDP. Firstly, the general trend in wages have been stable at the pre-Financial Crisis level, in Europe, which means that given the inflation levels consumers in Europe have generally experienced a real wage decline¹⁴⁵. Secondly, the falling inflation trend has continued in 2013, and the overall inflation level in Europe in 2013 was around

¹⁴⁴ Worldbank I

¹⁴⁵ European Working Conditions Observatory

1.5%¹⁴⁶. The current inflation level in Europe is actually so low that economist have begun talking about deflationary concerns¹⁴⁷, where consumers will postpone consumption, because they expect products to be cheaper in the future, which is a toxic cocktail, as it will delimit economic growth, as was seen in Japan in the 90's¹⁴⁸. Deflation is also a concern for banks, because deflation can lead to a fall in the price of real assets¹⁴⁹. For example, if a consumer has borrowed money in order to purchase a house, then he might end up with a house that is worth less than what the consumer has borrowed, and the consumer is then technically insolvent. It is therefore not unthinkable that deflation will lead to large losses on loans and greater loan impairments that will reduce the value of banks¹⁵⁰. Thus, both a decrease in GDP, real wages and the inflation rates leads to lower banking activities, higher losses and thus lower profitability.

Based on the above analysis, it is evident that the general wellbeing of an economy determines, to a large extent, banks' profitability. In addition, some of the factors reinforce each other, for example, the presence of both low interest rates and low inflation rates can lead to severe losses for banks, which in turn will lower their value. Thus, the economical factor is the single most important factor in determining banks' profitability, and banks can to no extent affect the economical factor.

Legal

Legislation is the formalized part of the political factor, because the politicians decide on the legislation, which is implemented through the legal factor. Thus, one can interpret legislation as a constraint on banks, because it limits their freedom to roam as they please. Legislation includes, amongst other, capital requirements, employment laws, consumer protection and depositor insurance. However, this section will focus on capital requirements and depositor insurance, since these are the most important aspects in answering the research question.

One can think of regulation through legislation in the way that it sets the frame within which banks can operate. The international regulatory body such as the EU commission lays out the laws applicable to EU member states¹⁵¹. On the national level the national governments lay out the law applicable to that country. Above the EU commission, is, for example, the Basel Committee, which

¹⁴⁶ Eurostat - HICP Inflation Rate

¹⁴⁷ Børsen I

¹⁴⁸ Forbes I

¹⁴⁹ Blanchard (2009)

¹⁵⁰ Federal Deposit Insurance Corporation 151 European Commission III

does not have any legislative power, but lays out minimum standards and gives recommendations, which are assumed to be commonly accepted and reinforced. The EU commission has chosen to adapt most of Basel's recommendations with some modifications¹⁵² through the CRD-IV. However, the countries that are not a part of the EU, i.e. Switzerland and Norway, implements the requirements from Basel III directly into their own national law. This can create an uneven playing field, as the Basel III requirements are lenient compared to the CRD-IV directive¹⁵³. For example, the Swedish government has imposed stricter regulation than the CRD-IV, while the German government has chosen to implement requirements close to CRD-IV¹⁵⁴. From this follows, that banks have to adapt to the national law of which country they operate in, thus, if a bank operates in Sweden and Germany, then the bank has to adapt to the stricter Swedish regulations in Sweden.

Thus, the variation in requirements, between countries, creates an uneven playing field. On one hand, this leads to Swedish banks and banks operating in Sweden safer than, for example, German banks, because the Swedish banks would have a greater capital base¹⁵⁵. On the other hand, the Swedish banks also face more constraints, which are costly for the banks and decreases their competitiveness among other European banks¹⁵⁶. However, Sweden might not experience future crises, because the banks have a larger capital cushion, however, the Swedish economy might still be affected if other European countries experienced another crisis. Swedish banks actually made it through the Financial Crisis relatively better, because of the favourable Swedish economic conditions¹⁵⁷, thus, it seems to make a difference. However, the capital requirements will work most efficiently if all countries implement more or less the same regulations, in order to prevent future crises, which is the aim of the Basel committee¹⁵⁸.

The value of the banks is therefore affected by national and international legislation and requirements, as it sets the frame within which banks can operate. In addition, the requirements also affect the economical factor, as the aim of the requirements is to create financial stability. As banks' profitability is highly dependent on the economic conditions, then the requirements seem to affect the banks positively, if higher capital requirements entail more stable economies.

154 The Swedish Wire 155 Financial Times III

- 157 The Washington Post
- 158 BIS I

¹⁵² European Commission II

¹⁵³ See figure 1, p. 6

¹⁵⁶ Guiso et al. (2006)

Lastly, depositor insurance is assumed to affect the value of banks. Depositor insurance means that the government guarantees customers' deposits¹⁵⁹. Hence, if a bank goes bankrupt, then the depositors will get their deposits back, thus, the depositors do not have to worry about their deposits in the banks, which in turn provides cheap funding for the banks¹⁶⁰. All the governments in this sample offer depositor insurance, which means that all the banks in this thesis are under some form of depositor insurance scheme. Most countries have a $\in 100,000$ guarantee¹⁶¹, while Norway and the UK have higher insurances¹⁶², and Switzerland has a lower guarantee¹⁶³. The European Central Bank estimated that by having a depositor insurance scheme of $\in 100,000$ it covers 95% of all deposits in European banks¹⁶⁴. The depositor insurance is profitable for banks because lower funding leads to lower interest expenses that could in turn lead to higher profit, ceteris paribus. Nonetheless, one should not forget that banks actually pay for the depositor insurance, by paying to the depositor guarantee fund¹⁶⁵. Further, the insurance only works if the customers believe that the banks' guarantee fund is able to pay them back, if the bank go bankrupt, or that the government will cover the deposits that the fund cannot cover, otherwise the customers might not place their deposits in the banks.

Based on the above PESTEL analysis, it is evident that the political and legal factor sets the frame and limits of within which the banks can operate. The factors highly affect banks behaviour and the banks' value. Further, the economical factor greatly affects the banks' profitability, and is the single most important factor in determining the banks' profitability. Even though these factors greatly affect banks profitability, then the banks cannot affect these factors.

7.1.2 Porter's Five Forces

The banking industry is analysed in the following section using the limited Porter's Five Forces framework, as described in section 6.1.2. Hence, the purpose of the section is not to perform an extensive strategic analysis, but to provide a strategic framework that outlines the most important factors for the subsequent analyses and in answering the sub question.

162 Bankernes Sikringsfond163 Financial Stability Board

165 Raaballe (2013)

¹⁵⁹ European Commission IV

¹⁶⁰ Morningstar

¹⁶¹ European Commission

¹⁶⁴ European Commission I

Bargaining Power of Buyers

The analysed banks are all *'financial supermarkets'*, which indicates that they provide most of the financial services that retail and corporate customers demand¹⁶⁶. The banks provide different services to different customers, hence, it makes sense to distinguish between retail and corporate customers, as there are considerable differences between them and their bargaining power.

The higher the relative size of the single product, the higher the customers' price sensitivity¹⁶⁷. Many retail customers have a mortgage loan, and since housing arrangements constitute the largest part of retail customers' total expenses¹⁶⁸, it is not unreasonable to assume that retail customers will have high price sensitivity. This is also true for the corporate customers, as they often have relatively many financial activities, within the same bank, such as various deposits accounts, cash management, pension schemes and foreign exchange transactions with the bank¹⁶⁹. Thus, corporate customers' amounts of financial activities expenses are also significant in terms of their total expenses. Thus, corporate customers are also assumed to be price sensitive.

On the other hand, the products, in the banking industry, are not differentiated, as most of the banks offer the same types of products, both to the retail and corporate customers, i.e. checking and savings accounts, mortgages, car loans, depositor accounts, pension schemes, cash management etc. Thus, low product differentiation lead to higher bargaining power of the retail and corporate buyers. However, high switching costs leads to a lower bargaining power of buyers. Competing banks will try to reduce switching costs by offering lucrative offers such as high-yield accounts and low-interest lending for a reduced period¹⁷⁰. Switching costs can both be monetary, i.e. fees from moving bank, and non-monetary, i.e. losing good personal relations with the former bank. The Nordic Council estimated that out of all retail customers wanting to switch banks, 19% did not do so because it was time consuming, and 17% did not switch banks because they had no personal relations with the other banks¹⁷¹. This illustrates that the non-monetary switching costs can be substantial. Even though buyers could benefit, monetarily, from switching banks, an analysis conducted by a Danish consumer counsel, Tænk, estimated that only 7% of Danish retail customers actually changed bank in 2012¹⁷².

¹⁶⁶ Only one bank, Banco Popular Espanol, does not provide CIB services, see appendix 28

¹⁶⁷ Clegg et al. (2011)

¹⁶⁸ Danmarks Statistik I

¹⁶⁹ Investopedia III

¹⁷⁰ Berlingske I

¹⁷¹ Uvildige 172 Tænk

This points in the direction that retail buyers are not willing to switch banks, which means that their bargaining power is somewhat lower. Thus, retail buyers seem loyal. In addition, the switching costs for corporate customers are also substantial¹⁷³. The monetary costs of switching banks for corporate customers are high, as they would have to change their whole financial setup, i.e. of accounts, cash management, pension schemes etc., which would be costly and take time to change. Further, the non-monetary costs of switching banks are also substantial, as the amount of business the corporate customers have with the bank is significant, thus, many personal relations might have been created between the bank and the corporate customer¹⁷⁴. The switching costs are therefore assumed high both for the retail and corporate customer.

Another element that will influence the bargaining power of buyers is the relative bargaining power between the two parties. The typical retail customer will not have a high relative bargaining power, due to the relatively low size of the business they bring to the bank. These customers will combined, typically constitute the largest part of customers, but on an individual level represent a small customer in volume-terms. As an example, Nordea has 546,000 corporate customers and 8,572,000 retail customers, and these contribute 26% and 54% respectively to operating income¹⁷⁵. It is evident that Nordea has almost 16 times as many retail customers as corporate customers, yet retail customers only contribute twice as much to operating income. This indicates that on average individual retail customer will not contribute as much as an average single corporate customer, which entails that the retail buyers will have a low relative bargaining power.

Corporate customers have considerable more bargaining power than retail customers do. This is primarily due to the volume of the business they bring to the bank. Using the example from above, Nordea's corporate costumers will, on average, bring more business to the bank than the average retail costumer will. This means that the more businesses they bring to the bank, the more bargaining power they will have¹⁷⁶.

Overall, it seems as if the typical retail buyer will have a somewhat lower bargaining power while the corporate customer will have a relatively higher bargaining power. This indicates, that the banks might be able to increase the lending rate of retail buyers, i.e. the banks may be able to charge higher

¹⁷³ Ernst & Young I

¹⁷⁴ Ibid.

¹⁷⁵ Nordea Annual report 2013

¹⁷⁶ Grant (2013)

lending rates that will, given a constant borrowing rate, lead to higher net interest margin. However, this is not the case with the corporate buyers.

Bargaining Power of Suppliers

Contrary to traditional production companies, i.e. non-financial companies, banks do not use raw material in its traditional sense. The primary 'raw material' that banks use is capital, and the capital stems primarily from deposits, debt issued to the market and equity¹⁷⁷. Banks use this capital in order to lend, and they thus profit from the difference between the interest on the money they borrow and the money they lend, i.e. the net interest margin¹⁷⁸. Banks' capital composition is made up of equity and debt and it is paramount for their continued operation¹⁷⁹. Equity, which is capital provided by shareholders, as well as, retained earnings, makes up a smaller part of the banks' overall capital composition, while the largest part of the banks' capital composition is debt. The relation between debt and equity, for the sample banks, is illustrated in appendix 4. From the graph in the appendix, it is evident, that almost all of the sample banks have more than 90% debt funding. Thus, debt represents, on average, 90.37% of the banks' balance across the 25 sample banks analysed. Debt funding is by far the most important supply of funding for banks, and the people who supply the debt is therefore the most important suppliers. As debt is crucial for banks, it might lead to banks having a low bargaining power. Debt comes primarily from deposits and wholesale funding, which will have different bargaining powers.

Suppliers of deposits are retail customers' savings and checking accounts, as well as, corporate customers' operating accounts. A single depositor has little bargaining power, as the banks' combined deposits are in billions of Euros, see appendix 5. Combining this with the average income of a Danish citizen, which is around \notin 40,000¹⁸⁰, one can easily envision that the bargaining power of a single depositor is limited. The collective bargaining power of all depositors is, on the other hand, substantial. If all depositors collectively decide to withdraw their deposits, the bank will be in severe liquidity problems. This is also known as a '*bank run*', which is often triggered by credibility issues as to whether the bank will survive¹⁸¹. A recent example is the Northern Rock bank in 2008, where depositors lost faith in the bank, following significant funding issues¹⁸². In addition, one has to

¹⁷⁷ Rixtel & Gasperini (2013)

¹⁷⁸ Investopedia I 179 Danske Bank I

¹⁸⁰ Danmarks Statistik II

¹⁸¹ Investopedia IV

¹⁸² BBC IV

remember, that the capital provided by one depositor is no different than the deposits provided by another depositor, and this leads to the supplied product being little differentiated, i.e. the bargaining power of the depositor seems low. Hence, customers cannot influence the rate they receive on their deposit accounts, as they have virtually no bargaining power. However, this does not indicate that the bank has a high bargaining power either.

The other major type of suppliers is the wholesale supplier, i.e. institutional investors. Wholesale funding relates, among others, to senior unsecured debt. Senior unsecured debt is one of the largest long-term funding sources for banks¹⁸³. Thus, this source of funding is important to banks, and one would therefore think that wholesale funders would have a large bargaining power. However, the banks' wholesale borrowing rate is determined through several market-based factors, and thus not through the bargaining power of wholesale suppliers¹⁸⁴.

The market-based factors include, among others, the bank's credit rating, the credit rating of the country, in which the bank is domiciled, and the bank's past performance¹⁸⁵. The bank's credit rating¹⁸⁶ as well as the country in which it is domiciled¹⁸⁷ will influence the bank's borrowing rate, because the credit rating is an indication of how safe the bank is¹⁸⁸. Hence, a bank with a higher credit rating will tend to have lower funding costs, as there is a lower risk of default¹⁸⁹. Moreover, the country's credit rating will also influence the bank's funding costs, because the banks and the countries are closely related, which indicates that the well-being of a country will influence the bank, and vice versa¹⁹⁰. Thus, if a country is facing difficulties it will influence the banks' funding options, as was evident with Italian and Spanish banks, that, in the midst of the South-European debt crisis, faced difficulties in raising long-term funding¹⁹¹. Another aspect that will influence the rate on wholesale funding is the banks' past performance¹⁹². If a bank's past performances have been excellent, then it indicates that the bank, all else equal, is more likely to be able to repay the borrowed funds, which will decrease the wholesale funding rate¹⁹³. One can therefore infer that it is the market

¹⁸³ Hau et al. (2012)

¹⁸⁴ Craig & Dinger (2013)

¹⁸⁵ ECB IV & Rixtel & Gasperini (2013) 186 ECB IV

¹⁸⁷ Rixtel & Gasperini (2013) 188 Investopedia V

¹⁸⁹ Clausen & Filges (2012)

¹⁹⁰ Rixtel & Gasperini (2013)

¹⁹¹ Ibid.

¹⁹² The Economist I & IMF I

¹⁹³ IMF I

that determines the wholesale funding costs, neither the bank nor the wholesale suppliers, as factors such as the credit rating and past performances that affect the banks' wholesale funding rate. As the wholesale suppliers cannot influence these factors, then their bargaining power is limited.

Based on the above analysis, it is clear that both the deposit suppliers and the wholesale suppliers have almost no bargaining power, but for different reasons. However, both types of suppliers are important to the banks, as funding is paramount for banks. Thus, either the bank, deposit suppliers or wholesale suppliers have any significant bargaining power. The market, i.e. the interaction of all the players, sets the funding rates.

Internal Rivalry

Based on the graph in appendix 6, it is evident that the HHI, i.e. Herfindahl-Hirschman Index, average is 781.7 points indicating that the banking industry is highly competitive¹⁹⁴. Thus, there are many providers of banking products, which create fierce competition¹⁹⁵.

Just about anyone who needs a bank already has a bank¹⁹⁶, meaning that new banks will have to lure existing customers into switching to the newly established bank. The new bank will therefore have to compete with banks, which are established in the market, and thus have some degree of brand recognition and perhaps loyal customers. Banco Santander targeted the Danish retail market by offering lucrative savings and checking accounts¹⁹⁷. Banco Santander did the same thing when entering the Swedish market in 2012, where they offered high-yield accounts with interest rates of up to 2.5%, which is substantially more than what domestic banks usually offer¹⁹⁸. Thus, it does not seem unreasonable to assume that offering lucrative terms is a way to make up for the switching costs associated with changing banks. This affects the competition in the industry greatly, as it results in banks having to steal customers from their competitors, if they are to grow their customer base¹⁹⁹. Due to the nature of the banking industry, where banks are constantly trying to allure other banks' customers creates intense competition 200 . The banks, in this sample, are all among the biggest in their domestic market, but they compete with banks all over the world²⁰¹. This means that the large banks

¹⁹⁴ US Department of Justice

¹⁹⁵ Salvatore (2007)

¹⁹⁶ Konkurrence- og Forbrugerstyrelsen (2013)

¹⁹⁷ Berlingske I 198 Ibid.

¹⁹⁹ Konkurrence- og Forbrugerstyrelsen (2013)

²⁰⁰ Ibid. 201 Ibid.

compete across Europe for the large pan-European companies, yet they also compete with many smaller banks in their respective domestic markets for domestic costumers. In a study by The Federal Reserve Bank of New York found that large American banks can fund themselves cheaper than smaller banks²⁰². This means that large banks will have some form of economies of scale, and it does not seem unreasonable to assume that this relation also holds for large European banks as well. This entails that newly established banks and small banks would have a disadvantage compared to large existing banks, which, ceteris paribus, decreases the competitive rivalry in the industry, among the banks in this sample. However, all in all the abovementioned elements create substantial competition within the industry, where it is difficult for the banks to increase their market shares²⁰³.

Banks have to find a way to differentiate themselves from other banks. However, the degree to which banks are diversified is low. All of the banks, in this sample, offer the same type of products to the same type of customers, which means that they all operate within the same business area, i.e. corporate, investment banking and retail banking to name a few²⁰⁴. As the banks offer similar products and services, they will have to try to differentiate themselves on non-price parameters in order to earn a profit, for example, through their business model. As an example, using Danish banks, Jyske Bank has differentiated themselves by building non-traditional branches where you do not approach a teller, but an 'ask-bar' where you can ask questions. Nordea has differentiated them by articulating that they focus on building lasting relations with their customers. This entails that the banks try to appeal to different customers on parameters other than prices. However, as the banks appeal to the same type of customers and are not highly differentiated, they will likely end up competing on price. Banco Santander competed on price when they entered both the Swedish and the Danish retail market, as described above²⁰⁵. Price competition intensifies internal rivalry and increase competition. Thus, as banks mostly compete on price, then it seems that banks can affect their own profitability positively, if they try to differentiate themselves, by for example developing a superior business model.

Based on the above analysis, it is clear that banks face fierce competition, which makes it difficult for the banks to, for example, increase their lending rates. The banks compete on price; thus, they

²⁰² Federal Reserve Bank of New York II

²⁰³ Konkurrence- og Forbrugerstyrelsen (2013)

²⁰⁴ See appendix 28 for a detailed view of the what business areas they operate in

²⁰⁵ Berlingske I

should try and differentiate themselves on non-price parameters, in order to be able to earn a substantial profit.

7.1.3 Sub Conclusion

It was clear, from the above analyses, that the external environment affects the banks' profitability. Banks' profitability was greatly influenced by the general economic conditions. The economy influenced how well banks could profit, because the banks' earnings were highly influenced by the interest rate, inflation rate, availability of debt and GDP. The political and legal factors imposed the limit and frame in which the banks could operate, thus, they indirectly affected the banks' ability to be profitable. Legislation influenced the banks' profitability through capital requirements, depositor insurance etc. The banks are not expected to become less systemically important to the society in the future, thus, politicians are expected to keep imposing laws that will benefit the society, but which might not benefit the banks' ability to profit. One should realise that banks cannot influence these factors to any extent, but they highly influence the banks' profitability.

Furthermore, it was found that the banking industry was highly competitive, which will limit the banks' ability to profit, compared to a monopoly setting. Based on the above analysis it was found, that the retail buyers' bargaining power was relatively low, thus, the banks might be able, to a small extent, to affect these customers, by for example, increasing their lending rates. Corporate buyers' had a higher bargaining power, thus, the banks are not expected to be able to increase their lending rates. Moreover, it was found either the banks, depositor suppliers or wholesale suppliers had any significant bargaining power, thus, the market, i.e. the interaction of all the players, sets the funding rates.

It can thereby be concluded that the economic, legal and political factors, as well as, the degree of competition, the bargaining power of buyers and suppliers greatly affects the banks' profitability. However, the banks might only be able to affect the retail buyers to a small extent, hence, the banks can therefore only affect their profitability level to a small extent.

7.2 Financial Analysis

The following section will use inputs from the above strategic analysis, in order to determine, what affects the banks' financial value drivers from 2006 to 2012. The findings will then be used in the valuation.

7.2.1 Net Interest Income

As mentioned in section 6.2.1, the net interest income (NII) is one of the most important value-drivers for banks. This is so, as it shows how well banks can profit on the difference between the borrowing and lending rate, i.e. the net interest margin, which is one of the banks' main sources of profitability²⁰⁶. A high NII indicates that the bank has a high interest margin, i.e. the bank borrows at a lower rate than its lending rate. On the other hand, a low NII indicates that the bank has a lower interest margin. Hence, a high NII is preferable.

As NII is an absolute measure, then it is more meaningful to compare the changes of NII on a percentage *year-on-year* basis, hereafter *yoy*, because it makes the comparison across banks possible. When one compares the NII on a percentage *yoy* basis, then one can see the changes from one year to the next in percentage terms. It is easier to compare the percentage change, than the development of an absolute number. In the figure below, one can see the average percentage change in the NII from 2007 to 2012. For more detail, the banks' NII can be seen in appendix 7.



Source: Bankscope, own calculations

²⁰⁶ Beitel et al. (2011)

As mentioned above, NII is the difference between the borrowing and lending rate, and factors that influence these rates will therefore influence NII. As mentioned in section 6.2.1, the interest rate level and GDP will, amongst others, influence NII. In section 7.1.1, it was found that the interest rates fell from 2007 through 2012 and GDP decreased from 2007 to 2009, thus the economies moved into a low-interest rate environment. A decrease in GDP leads to less growth in the society, which affects the size of banking activities negatively. If banks are not able to lend out as much, then they cannot earn as much. Further, a low-interest level environment affects the banks' lending margin negatively, as, for example, in a low-interest level environment the bank might be able to borrow and lend at 1%, which makes the net interest margin 0%, i.e. the bank fails to profit. Yet, if the economy is in a high-interest level environment then the bank might be able to borrow at 4% and lend at 5%, which makes the net interest margin 1%, i.e. the bank profits. Thus, the banks' profit less in a low interest environment, as the banks' lending and borrowing rate will be under pressure, which decreases NII, given the same borrowed and loaned amount.

Another factor that influences NII is the capital requirements, which will be shown in detail in 7.3.2.1. Higher capital requirements will lead to higher required income, which might increase the lending rate. If the lending rate increases, then NII will increase, ceteris paribus. Whether a bank is able to increase its lending rate depends on its bargaining power towards buyers. Based on the analysis, in section 7.1.2, banks' might be able to increase their lending rate towards retail buyers, but not towards corporate buyers, as retail buyers had a lower bargaining power. This indicates that higher lending rates, due to higher capital requirements, will increase NII, all else equal.

In the figure above, the banks' NII increased, on average, with 31.79% from 2006 to 2008. This could be explained by the increase in GDP, as analysed in section 7.1.1, as a booming economy will lead to more business activities for the bank, and thereby higher lending volumes²⁰⁷. Higher lending volumes will, ceteris paribus, increase the banks' interest income, which will, given the same lending and borrowing rate, increase NII. For example, UniCredit and Deutsche Bank experienced an increase in their NII, due to an increase in their loan portfolio, which led to higher lending volumes in 2006 to 2008²⁰⁸. Thus, it seems that the positive growth in GDP positively influenced NII in the years 2006 to 2008.

²⁰⁷ Rangvid (2013)

²⁰⁸ UniCredit & Deutsche Bank annual reports 2006, 2007 and 2008

From 2008 to 2009 NII increased at a significant decreasing rate. The increase was on average 11.83%. This development could be explained by the large decrease in GDP and in the interest rates levels from 2008 to 2009, as shown in section 7.1.1. As previously described a decrease in GDP leads to less business activities, which will influence the lending volumes negatively and thereby decrease NII, ceteris paribus. In addition, low-interest levels decrease both the lending and borrowing rate for banks, which can lead to a lower NII. Moreover, it was discovered that retail buyers have a lower bargaining power, and banks might be able to increase their lending rates. Thus, the increase in NII might be due to banks' ability to increase their lending rates more than what their borrowing rate decreased with, as low-interest levels decreases all interest rates levels in the economy, and thereby also the lending and borrowing rate. A report by McKinsey & Company confirms this, as it shows that banks are able to increase their lending rates, and that increasing lending rates is a common measure, among banks, to use in order to increase their NII²⁰⁹.

In addition, the funding market, i.e. the availability of debt, also influenced NII. For example, Royal Bank of Scotland's (RBS) NII decreased in 2008, as they experienced severe funding problems²¹⁰. The availability of debt influence NII, as if there is no debt available for banks to borrow, then they are not able to lend out money either, and if banks cannot lend, then their NII will decrease, as they will not earn any interest income. In the case of RBS, some debt was available, however, it was expensive, due to the great uncertainty involved with RBS in 2008. Thus, funding difficulties may cause interest expenses to increase, which will decrease NII, ceteris paribus. Thus, in the years from 2008 to 2009, the general economic development, the interest rates levels and the availability of debt, caused the average rate of NII to decrease significantly. However, the banks' ability to increase lending rates caused the overall development in NII to be positive.

From 2009 through 2012, the NII continued to increase at a decreasing rate. Over these years, the NII increased, on average, with 8.87 %. The reasons why NII increased at a decreasing rate could be explained by the same factors as in the above paragraph, i.e. the low-interest rate levels, the lending rate and the availability of debt. However, the stable rate of which NII increased with can be explained by the slow increase in GDP. The slow increase in GDP, combined with the low-interest rate levels, low availability of debt and banks' ability to affect lending rates, caused the NII to increase at a lower

²⁰⁹ Beitel et al. (2011)

²¹⁰ Telegraph I

rate than previously. An increase in GDP would, ceteris paribus, increase banks' business activities and thereby lending volume, which would increase NII, if the lending rate, borrowing rate and borrowing volume were assumed constant. However, the positive but slow development in GDP is not enough to offset the negative impact of the low-interest levels and low availability of debt on NII, in order to make NII increase at an increasing rate. NII therefore increase at a lower rate than previously.

Furthermore, the new and higher capital requirements were published in 2010, thus, could explain the lower rate of which NII increased with. The higher Tier 1 ratio could influence NII in two ways. Firstly, if a bank chooses to increase its Tier 1 ratio through a reduction in its total assets, then the bank would, ceteris paribus, have less necessary equity to facilitate loans with, which would decrease the amount of loans the bank can facilitate. This would decrease the lending volume, and thereby lower NII, if the lending rate, borrowing rate and borrowing volumes are assumed constant. However, if a bank increases its Tier 1 ratio by issuing more equity, then the bank would have more necessary equity to facilitate loans with, which would increase the amount of loans the bank can facilitate, which would increase the lending volumes, and thereby increase NII. Secondly, a bank with a higher Tier 1 ratio might be perceived as safer, which might decrease the bank's funding costs, and thereby decrease the bank's interest expenses, which in turn would increase NII.

However, the overall increasing trend from 2009 to 2012 seems to be explained by the increase in GDP. Nonetheless, it seems that the low-interest levels, low availability of debt and the higher capital requirements leads NII to increase at a decreasing rate.

Conclusively, NII has increased throughout the time period, however, from 2008 and onwards at a decreasing rate. From the above analysis it is clear that the GDP levels, the interest levels, the availability of debt, the banks' ability to affect their lending rate and the new capital requirements all have affected NII.

7.2.2 Cost-to-Income Ratio

This ratio is important when analysing what affects banks' profitability²¹¹. This ratio indicates how effective the banks are in profiting from their core activities²¹², i.e. how solid their business models

²¹¹ MoneyWeek I

²¹² Beitel et al. (2011)

are. When the ratio is low, it indicates that the bank is run efficiently, i.e. its income is substantially greater than its costs. On the other hand, if the ratio is high, it indicates that the bank is not as good at controlling its expenses in relation to its income²¹³. The overall economy and interest levels influence the income part of the ratio. A more efficient business model will especially affect the cost side of the ratio, as a solid business model will lead to a more efficient cost base, i.e. a lower cost-to-income ratio. In figure 5 below, the average development in the cost-to-income ratio, for the sample banks, is shown. In appendix 8, the banks' average cost-to-income ratios can be seen for 2006 to 2012.





From the figure above, it is evident that the average ratio decreased slightly from 2006 to 2007. This can be explained by the increase in interest rates levels, from 2006 to 2007, as higher interest rates levels leads to both higher lending and borrowing rates. Thus, if the lending rate has increased by more than the borrowing rate, then the ratio would decrease, as then operating income would have increased by more than operating expenses. Moreover, GDP increased from 2006 to 2008, which could explain the fall in the ratio, as higher GDP increases banking activities, which increases lending volumes. Thus, if both lending volumes and lending rates increased, then operating income might have increased by more than operating costs, which would decrease the ratio. This is confirmed, if one looks at the graph in appendix 9, as it is evident that the banks on average increased their loan portfolio, i.e. lending activities, with 15.56% from 2006 to 2007. Thus, the overall economic

Source: Bankscope, own calculations

²¹³ MoneyWeek I

conditions seem to have led to a lower cost-to-income ratio, as banks' operating income increased by more than its operating costs.

From the above figure, it is evident that the cost-to-income ratio increased from 2008 to 2010. GDP decreased significantly from 2008 to 2009, see section 7.1.1, which could explain the increase in the ratio. When GDP decreases then the amount of banking activities are likely to decrease, which leads to lower lending volumes. If lending volumes decrease, then interest income is likely to decrease, which would decrease operating income and thereby increase the ratio, if costs stay unchanged, ceteris paribus. Furthermore, the interest rate level decreased in the same time period, see section 7.1.1, which would decrease both the lending and borrowing rates, which could decrease both interest income and interest expenses and thereby operating income and operating costs. However, interest income might have decrease more, as lending volumes, due to GDP, were likely to decrease too. Some banks such as UBS and Credit Suisse were particularly affected by the worsening economic conditions in particularly the decreasing interest rates and the falling GDP growth²¹⁴, which led to substantially higher cost-to-income ratios for these two banks.

Some banks were able to maintain a low ratio in the years 2008 to 2010, which could indicate that these banks had a superior business model compared to the banks with significantly higher ratios. Nordea and Svenska Handelsbanken maintained their low ratio in these years, as evident from the table in appendix 8, and since they were also affected by the worsening economic conditions, it indicates that these banks had better cost control systems, i.e. a superior business model, as compared to, for example, UBS. Further, the Spanish banks, Banco Popular Espanol and Banco Santander, were able to maintain a lower than average cost-to-income ratio in 2008 to 2010, compared to other South-European banks, also evident from the table in appendix 8. As both Spain²¹⁵ and Italy²¹⁶ were facing similar unfavourable economic conditions, this indicates that the Spanish banks' business models might have been superior to the Italian banks' business models, as the Italian banks' ratio increased substantially. This underlines the importance of the banks' business models, as it can influence the individual banks' profitability, because, in this case, a strong business model hat control costs, led to banks being more efficient than it peers given the same difficult economic conditions.

²¹⁴ UBS and Credit Suisse annual reports 2008 and 2009.

²¹⁵ BBC III

²¹⁶ Spiegel I

The final trend in the above figure is the decrease from 2010 to 2012. The GDP began to increase again in 2010, which could have influenced the operating income positively, based on the same arguments as in the above section, which would decrease the ratio. Further, the interest rate levels were still low, which in combination with an increasing GDP, could influence operating income positively, which would result in a lower ratio as well, if operating costs stayed unchanged. However, the economic conditions were not fully optimal in 2010 yet, thus, the fall in the ratio could also be attributed to the banks' business model, if they, for example, were able to adjusted their cost base to the challenging economic conditions. This could, for example, be done through a reduction of staff, which Credit Suisse²¹⁷ and Deutsche Bank²¹⁸ actually did in 20011 and in 2012 respectively. Banks could also reduce their costs by streamlining their processes through the use of new technology. Both Danske Bank²¹⁹ and Crédit Agricole²²⁰ actually invested heavily in internal IT-systems in 2010, which led to an increase in the banks' efficiency, and thereby to a decrease in the banks' costs, which decreased their ratios.

Swedish banks have had low stable ratios throughout the time period, as can be seen in appendix 8. This could indicate that these banks have had a more efficient business model, where they have been able to better control costs than some of their peers. Hence, these banks might have been better at controlling their cost base, and adjusting to the new and more challenging economic conditions. Nordea, Svenska Handelsbanken and Swedbank have all had low ratios throughout the years. However, the Swedish economy was also one of the few economies to quickly revert to GDP growth after the Financial Crisis. McKinsey & Company made a study and found that three out of four banks, which had positive total shareholder returns in the period 2007 to 2011, were Scandinavian banks, and two of which, were banks from Sweden²²¹. This finding could indicate that the Swedish banking market was more attractive, than many other European markets, during the Financial Crisis. However, the findings could also indicate that Swedish banks were more efficiently run, and that they had a better business model. Thus, the combination of favourable economic conditions and an excellent business model seems to have led to lower cost-to-income ratios for the Swedish banks.

²¹⁷ Credit Suisse annual report 2011

²¹⁸ Deutsche Bank annual report 2012

²¹⁹ Computerworld

²²⁰ Accenture II

²²¹ Beitel et al. (2011)

Thus, it seems that GDP and the interest rate level greatly affects the cost-to-income ratio and thereby the value of the banks. In addition, it also seems that an efficient business model affects the ratio positively, and thus the value of the banks. Thus, a superior business model can give a bank a competitive advantage especially in a challenging environment.

7.2.3 Loan Loss Impairment

Loan loss impairments shows the amount that banks believe they will have to forego because of lack of paying customers²²². Thus, it indicates how much banks believe they will have to write down their loans with. There are several reasons for why the banks' management teams believe they will have to write down their loans. Foremost it might be due to customers being unable to pay the interests on the loan. Further, the management team might realise that they are exposed to a specific industry, such as the shipping industry, farming industry or, in the case of Danske Bank, the real estate market²²³. If the bank is exposed to a specific industry, and that industry is challenged because of, for example, increasing competition, changing industry conditions or scarce resources, then the bank might increase its impairments on the loans to that industry because they believe they might acquire loan losses²²⁴. Thus, loan loss impairments indicate how the management team assess, based on an impairment test²²⁵, the future success of being paid back. One should be aware, that each impaired loan is a consequence of an impairment test, the banks make on each loan. Thus, the banks do not impair all loans to a specific industry, without proof that the companies in that industry might not be able to pay back their loans²²⁶. The developments of banks' loan loss impairment levels are therefore individual and are influence by bank specific conditions, such as their lending policies²²⁷.

Low loan loss impairments indicate that the management team has positive expectations to the future economy and most borrowers have the ability to pay back their loans. If loan loss impairments are high it indicates that the management has less positive expectations regarding the likelihood of being paid back fully. This might lead to high loan losses. High loan losses might lead to overall losses for the banks, which might decrease the banks' equity level, as losses reduce the banks' equity²²⁸. If loan losses are significant enough to cause overall earnings to be negative, then one might expect the value

- 224 Bankers Toolbox I
- 225 Deloitte
- 226 Bankers Toolbox I

²²² Deloitte

²²³ Danske Bank annual report 2011

²²⁷ DeLeon & Stang I

²²⁸ Berk & DeMarzo (2011)

of the bank to decrease, due to lower equity amounts, i.e. higher risk, and the concern for future loan losses²²⁹.

Loan loss impairments are not a ratio, but an absolute number. Thus, it is difficult to compare an absolute number across the sample banks. In order to analyse the value driver properly each banks' loan loss impairments are converted into a percentage change on a *year-on-year* basis, hereafter *yoy*.

In the figure below, the average percentage development in the sample banks' loan loss impairments is shown. Moreover, the banks' loan loss impairments can be seen in appendix 10.



Source: Bankscope, own calculations

From the above figure, it is evident that loan loss impairments have increased throughout the time period, however, at different rates. Loan loss impairments increased at an increasing rate from 2007 to 2009, and at a more or less decreasing rate from 2009 to 2012. The reasons why loan loss impairments have increased from 2007 to 2012 are the same, thus, will be analysed in conjunction. The banks' loan loss impairments increased, on average, with 159.48% from 2006 to 2012, i.e. a highly increasing trend, see appendix 10. The reason why loan loss impairments increased from 2007 to 2012, even though at different rates, was due to the following explanations. The trend could be explained by the decrease in GDP, from 2008 to 2012, and the decline in real wages, which led to

²²⁹ Nordnetbloggen I

overall worse economic conditions for the banks' customers. The combination of unfavourable economic conditions and real wage declines might have increased loan loss impairments, as the customers might not have been able to pay their obligations²³⁰. When customers default on their loans, then the bank's management might begin to impair the loans, as the probability of receiving the loans decrease. Thus, the management team might write down loans if they believe the overall economic conditions will worsen, because of, for example, deflation, low interest rates, high unemployment or low GDP growth, as it might lead to customers being unable to pay their loans²³¹. Hence, it seems that the economic conditions causes customers to be unable to pay their loans, which forces the management team to impair the loans.

The banks cannot influence the overall economic conditions, but the banks might be able to affect the extent of which their loan loss impairments will increase. Lloyds and Danske Bank had, for example, larger than average increases in loan loss impairments in 2008 to 2009, which could be explained by the banks' poor lending policies. The significant loan loss impairment increase could be explained by the banks being highly exposed to the subprime-mortgage market²³² and to the small-and-medium size enterprises²³³, which creditworthiness decreased greatly from 2008 to 2009. This indicates that Lloyds and Danske Bank's lending policies might explain their higher than average loan loss impairment increase. Thus, if a bank's lending policy is conservative, i.e. the bank does not lend money to risky projects, and diversified, i.e. the bank is not highly exposed to few industries, then it indicates that the bank might have a superior business model, where it might not incur high unexpected losses, ceteris paribus. This shows that, if a bank is highly exposed to few industries and one of these industries experience high loan losses, then the bank's loan loss impairments might increase substantially, which might affect its valuation negatively²³⁴.

From the above analysis it is clear, that the economic conditions are the single most essential factor in determining the overall development in loan loss impairments. Thus, the economy of which the banks operate in, or are exposed to, is the main driver of the development in loan loss impairments. This is because the economic conditions affect the activity level in the society. Thus, if GDP decreases then the activity level in the societies might decrease, which will led to people getting fired and thus

²³⁰ MyBudget I

²³¹ DeLeon & Stang I

²³² Lloyds annual report 2009

²³³ Danske Bank annual report 2009

²³⁴ Nordnetbloggen I

unable to repay their loans. Thus, the banks' management teams will impair the loans because of the economic conditions. Nonetheless, it seems that the banks might be able to affect the extent of which their loan loss impairments increase or decrease with through a conservative and diversified lending policy.

7.2.4 Leverage Ratio

The leverage ratio is a part of the Basel III regulations, thus, directly influenced by the new capital requirements. The leverage ratio indicates how levered a bank is, i.e. how much equity the bank has in relation to its total asset base, thus, the leverage ratio indicates how much debt the bank uses²³⁵. If the ratio is low, then banks have a large proportion of debt to its total assets. As mentioned in section 6.2.4, the leverage ratio will be directly affected by the increasing capital requirements, as the higher capital requirements forces banks to increase their amounts of equity, and thereby to increase their leverage ratio. The CRD-IV requirements impose a minimum leverage ratio of 3%²³⁶, thus, it is expected that all the banks will have higher leverage ratio than 3%. In the figure below, figure 7, the average development in the leverage ratio is shown. In appendix 11 the banks' leverage ratios can be seen.



Source: Bankscope, own calculations

²³⁵ Accenture I

²³⁶ Bank for International Settlement (2011)

Based on the above figure it is evident, that the average leverage ratio decreased from 2006 to 2008, which indicates that the banks got more leveraged in this time period, which was in the middle of the Economic Bubble²³⁷. During the bubble the banks' lending amounts increased significantly, however, they were mostly financed with debt, which would cause the ratios to decrease²³⁸. Further, debt was not perceived as being a risky financing form, as investors were not concerned with the default risk in this time period²³⁹. Furthermore, there were many bank acquisitions from 2006 to 2008. For instance, Barclays purchased the trading and investment bank division of Lehman Brothers, which led to an increase in their total assets, as a large trading portfolio was acquired, which in turn decreased Barclays' leverage ratio²⁴⁰. Other examples includes Danske Bank's acquisition of Sampo Bank²⁴¹, RBS's takeover of ABN Amro²⁴² and Banco Santander's purchase of Alliance & Leicester²⁴³, which all led to an increase in the banks' asset base, thus, causing the leverage ratio to decrease, because the banks' assets increased more rapidly than their equity bases, as the acquisitions were debt financed.

Based on figure 7, it is evident that the leverage ratio increased from 2008 to 2010 and was hereafter stable from 2010 to 2012. It is not surprising that the leverage ratio increased from 2008 to 2010, as the new Basel III regulations were published in 2010, but had been publicly discussed beforehand. The new requirements forced the banks to increase their amounts of equity, which caused the ratio to increase. As an example, Danske Bank²⁴⁴, Nordea²⁴⁵, Erste Group²⁴⁶ and Société Générale²⁴⁷ had all raised new equity in these years, in order to meet the higher capital requirements. Further, it is not surprising that the leverage ratios were stable from 2010 to 2012, as the requirements forced the banks to keep more equity. Thus, due to the requirements the banks could only hold more equity, i.e. have high ratios, than they currently had.

One should notice that the leverage ratio is not significantly higher in 2012 than it was in 2006, which is puzzling as the new capital requirements were published in 2010^{248} . One would have expected the

242 BBC I

244 Danske Bank III 245 Nordea III

247 Bloomberg II

²³⁷ Rangvid (2013)

²³⁸ Ibid.

²³⁹ Sorkin (2009) 240 The Guardian I

²⁴¹ Danske Bank annual report 2007

²⁴³ BBC II

²⁴⁶ ErsteGroup I

²⁴⁸ See section 7.3, on capital requirements

ratios to have increase significantly from 2010 to 2012. Nevertheless, based on the above analysis, it is evident that the capital requirements greatly affect the leverage ratio.

7.2.5 Return on Equity

ROE indicates how well a bank is able to earn a return on its equity²⁴⁹. A high ROE indicates that the bank is successful in earning a return on its current equity²⁵⁰. As described in section 6.2.5, ROE is influenced by the four value-drivers analysed above, i.e. NII, cost-to-income ratio, loan loss impairment and the leverage ratio. Moreover, ROE is also influenced by the development in GDP, the interest rate levels and the capital requirements. The following figure, figure 8, shows the average development in ROE from 2006 to 2012. Furthermore, the banks' ROEs, over the time period, can be seen in appendix 12.



Figure 8: Average ROE Development

Source: Bankscope, own calculations

From the above figure it is evident, that the average development in ROE is negative from 2006 to 2012. ROE decreased from 16.48% in 2006 to 2.4% in 2012. In addition to the overall negative development, three trends are evident.

Based on the above figure, it is evident that ROE decreased from 2006 to 2008, from a ROE of 16.48% to 2.03%. This trend can be explained by the decrease in GDP and interest rate levels, as well

²⁴⁹ Berk & DeMarzo (2011) 250 Ibid.

as, the increase in loan losses during this period. As described in section 7.1.1, a decrease in GDP leads to less business activities for the banks²⁵¹. This leads to lower earnings and causes ROE to decrease, all else equal. Moreover, the decrease in interest rate levels affect the banks' borrowing and lending rates. This will decrease the banks' earnings level, which will decrease ROE, all else equal, as analysed in section 7.1.1. Furthermore, the deteriorating economic conditions during this period caused more borrowers to default on their loans²⁵², which led to higher loan losses. As was previously analysed in section 7.2.3, higher loan losses can lead to lower earnings, which, given the same equity level, will cause ROE to decrease. This was also evident in the loan loss impairment analysis, section 7.2.3, where it was analysed that loan loss impairments increased from 2006 to 2008. For example, UBS and KBC incurred large declines in their earnings from 2006 to 2008. UBS incurred large trading losses, due to falling interest rates, and both UBS and KBC incurred large loan losses, which lead to their lower earnings in 2008²⁵³. The falling interest rates and high loan losses caused UBS and KBC's ROEs to decrease significantly from 2006 to 2008, see appendix 12.

From the above figure, it is evident that the average ROE increased, from 2008 to 2010, as ROE increased from 2.03% to 7.52%. According to section 7.2.1, the banks' average NII increased during this period. A higher NII leads to higher earnings, which, given the same equity level, leads to higher ROEs. Thus, NII might have affected the increase in ROE, which is supported by a report from McKinsey & Company²⁵⁴. The report argues that the banks' operating profit margins increased, from 2008 to 2010, which would cause the banks' ROEs to increase. As an example, DnB's NII increased from 2008 to 2010²⁵⁵, while their operating costs decreased²⁵⁶, which led to a higher ROE. One might have expected ROE to decrease in this period, as the banks' average leverage ratios increased from 2008 to 2010. This indicates that the banks' earnings must have increased significantly in order for the banks to increase their ROEs, as their equity levels were increasing as well during this period.

Lastly, the banks' average ROE decreased, from 2010 to 2012, from a ROE of 7.52% to 2.4%. As analysed in section 7.1.1, GDP decreased and the interest rate levels were low, in this period. Thus, the deteriorating economic conditions might have affected the banks' earnings negatively, and thereby led to a decrease in ROE. Moreover, as previously stated in section 2.1, the CRD IV

- 252 MyBudget I
- 253 UBS and KBC annual report 2008 254 Beitel et al. (2011)

²⁵¹ The Guardian II

²⁵⁵ See appendix 7

²⁵⁶ DnB annual report 2010

requirements were introduced in 2010, which required the banks to increase their capital levels. Higher capital levels will decrease ROE, if earnings are not increased. For example, Deutsche Bank raised new equity in 2010, which increased their overall equity base. At the same time, the bank's earnings decreased²⁵⁷, due to lower interest rates and unfavourable economic conditions, which led to a decrease in Deutsche Bank's ROE, from 2010 to 2012, see appendix 12. Deutsche Bank was not a unique example. On the other hand, it is evident from appendix 12, that the Swedish banks all had ROEs substantially above the average. All the Swedish banks had ROEs of more than 10% in 2012, which indicates that these banks were more successful in earning a return on their capital than the average bank. This was likely due to their exposure to the favourable Swedish economy and their low cost-to-income ratios, as analysed in section 7.1.1 and 7.2.2. Nevertheless, the combination of higher capital levels and lower earnings, due to lower interest rates, falling GDP and higher loan losses, led to the decrease in the average ROE from 2010 to 2012.

Based on the above analysis, it is evident that the overall economic conditions such as GDP, interest levels, loan losses greatly affect ROE. The new capital requirements published in 2010 also seemed to affect ROE. Thus, the banks' profitability is highly correlated with the overall state of the capital markets and the economy. The above analysis also indicates that the NII, the cost-to-income ratio, the loan loss impairments and the leverage ratio all affect ROE.

7.2.6 Sub Conclusion

Based on the above analysis, it was clear that the five financial value drivers all greatly affected the banks' profitability. Further, it was found that the state of the capital markets, the interest rate level, the GDP, the loan losses, the availability of debt, the capital requirements, the banks' lending and borrowing rates, the banks' business models and the banks' lending policies all affected the financial value drivers. Further, it was found that the NII, the cost-to-income ratio, the loan loss impairments and the leverage ratio all affected ROE. Lastly, it was clear that the overall state of the economy and the general economical conditions affected the value drivers to the greatest extent.

7.3 Capital Requirements

The capital requirements are the essence of this thesis, and are thus important to understand. From the above two analyses, i.e. the strategic framework analysis and the financial analysis, one

²⁵⁷ Deutsche Bank annual report 2010

understands the dynamics of the banking industry and what affects the financial value drivers. Firstly, an analysis of whether M&M's theorem holds in a real life will be calculated and conducted. Lastly, a simple model will be used to shed light on how exactly capital requirements affect banks' financial statements. The purpose of this section is to be able to conduct the scenario analysis in the valuation section.

There is no doubt that banks face strict regulations and high requirements, which make sense as the total societal cost of financial crises are high. Reinhart and Rogoff (2009) estimated that financial crises reduce GDP with a minimum of 10% and most of the reduction seems permanent²⁵⁸. Nonetheless, according to M&M the change in capital requirements should not affect the valuation or the society; thus, it is interesting to investigate to what degree M&M holds in real life. If M&M's theory holds 100% then, due to the high financial costs of financial crises, all banks should face much higher capital requirements, since it would not alter their valuation.

7.3.1 Estimating the Degree of M&M

Following the discussion of M&M in section 6.3.1, it is clear that M&M argues that as banks increases their amount of equity, then the required rate of return on equity should fall and that WACC is independent of the capital structure²⁵⁹. The main concern is the effect the capital requirements, i.e. capital structure, has on banks' funding opportunities. Banks profits from the difference between their borrowing and lending rate. According to M&M's theory, banks funding costs should decrease when the bank becomes less leveraged²⁶⁰. Funding costs, cost of debt and borrowing costs will be used interchangeably unless stated otherwise. It is evident that M&M is not fully applicable to banks, due to the restrictive assumptions that the theory is based on²⁶¹.

However, M&M's theory might not be a poor stating point, as Kashyap et al. (2010) only found limited effects on banks' lending rate, i.e. an increase of 2.5 to 4.5 basis point for a one percentage point increase in the capital ratio, in the long-run steady state²⁶². It is thus interesting to investigate what the effect of a change in the capital requirements will have on the required rate of return on

²⁵⁸ Cited in Miles et al. (2012)

²⁵⁹ Miles et al. (2012) 260 Ibid

²⁶⁰ Ibi

²⁶¹ Ibid.

²⁶² Kashyap et al. (2010)

equity and funding costs²⁶³. However, the offsets between the costs of equity and debt might not be exactly the same, due to the tax shield, implicit government guarantees, 'too big to fail' subsidiary and depositor insurance²⁶⁴. It has been empirical shown that taxes do have an effect on banks' capital structure, as for example, Weichenrieder and Klautke (2008) estimates that a 10% increase in the tax rate would increase the debt-to-asset ratio with 1.4 to 4.6 percentage points²⁶⁵. Desai et al. (2004) finds the effect to be an increase of 2.6 percentage points²⁶⁶. Thus, the increase in capital requirements will limit the bank's ability to exploit the tax shield, however, the increase in tax payment is not lost from a societal perspective. The society might be better off as the government might receive more tax revenue and at the same time might be able to decrease the implicit government guarantees and the 'too big to fail' subsidiary to banks, as the probability of banks going bankrupt decreases²⁶⁷. This would indicate that the society might be better off with more equity-financed banks. Depositor insurance leads to lower funding costs, as the government guarantees the deposits²⁶⁸. Thus, as debt liabilities are secure it might give banks an incentive to use debt finance instead of equity finance²⁶⁹. However, depositor insurance and government guarantees does not alter the conclusions of M&M, i.e. if a bank becomes less leveraged then the required rate of return on equity should fall, no matter how safe the debt is. M&M actually assumes that debt is risk-free²⁷⁰. The question is now to what degree M&M's theory hold despite of these challenges.

Calculating the extent of the presence of M&M's theory is based on the same approach used in the article by Miles et al. (2012). The basis for this approach is CAPM. Thus, it is the link between leverage and the banks' cost of equity that is investigated in order to investigate if the cost of capital changes when leverage decreases, i.e. an increase in capital requirements²⁷¹. The equation for CAPM used in this thesis is as follows

$R_{Equity} = r_f + \beta_{Equity} \times R_{Premium}^{272}$

Hence, it is assumed that the equity risk of a bank is replicated in the bank's equity beta²⁷³. The equity beta is calculated by estimating the correlation between the return on the bank's shares and the market

²⁶³ Kashyap et al. (2010)

²⁶⁴ Ibid. 265 *Cited in* Miles et al. (2012)

²⁶⁶ Ibid.

²⁶⁷ Miles et al. (2012)

²⁶⁸ Ibid. 269 Ibid.

²⁶⁹ Ibid. 270 Ibid.

²⁷¹ Ibid.

²⁷² Ibid.

²⁷³ Ibid.

return. The correlation was calculated by using the following formula $\beta_i = \frac{Cov(R_m,R_i)}{Var(R_i)}^{274}$. The covariance and variance was calculated by using the monthly closing price of the market index and each banks' shares. To replicate the market return the Stoxx 600 index was used, as it represents 600 companies in eighteen different European countries. The estimated betas can be seen in appendix 13. As the risk-free rate, a ten-year German government bond was used, as it is assumed to be the safest government bond in Europe at the moment. The effective rate was found on Bloomberg and was 1.316% on December 31st 2012. It is rather difficult to calculate the risk premium for each bank, as many subjective assumptions then have to be made. Thus, Aswath Damodaran's approach will be used. He has calculated the average risk premium for all the countries in the sample and has derived at a risk premium for Europe for 2013 at 7.59%²⁷⁵. Miles uses a risk premium of 5% for UK banks in 2010. Thus, 7.59% seems reasonable, as Italian and Spanish banks are a part of this thesis' sample. In addition, 2010 was actually a good year as market indexes increased²⁷⁶. In 2011 and 2012 the debt crisis came, which made investors demand a higher return due to the increase uncertainty²⁷⁷.

Miles et al. (2012) assumes that beta of debt is zero, thus, the equity beta equals asset beta times total assets over equity

$$\beta_{Asset} = \beta_{Equity} \frac{E}{D+E} + \beta_{Debt} \frac{D}{D+E},$$

if $\beta_{Debt} = 0$, then $\beta_{Equity} = \beta_{Asset} \frac{D+E}{E}^{278}$

The fraction of total assets over equity is what is referred to as the leverage ratio²⁷⁹. Keep in mind that this calculated leverage ratio is different from the one used in Basel III and the one analysed in section 7.2.4. Thus, it seems that equity risk should decrease linear with leverage²⁸⁰. One can now link M&M's theory to the CAPM. The above equation implies that if one doubles the equity, because of the new capital requirements, and assumes that the risk of the bank's assets stays unchanged, i.e. accordingly to M&M, then as the same equity risk is now spread over twice as much equity, then each share of equity should only bear half the risk²⁸¹. This result in the required rate of return on equity should fall by half²⁸². Nonetheless, it is a strict assumption to make that debt is risk free, i.e.

²⁷⁴ Berk & DeMarzo (2011)

²⁷⁵ Damodaran II

²⁷⁶ Development of stock index in 2010: Stoxx I

²⁷⁷ Johannesson (2011)

²⁷⁸ Miles et al. (2012) 279 Ibid.

²⁷⁹ Ibid. 280 Ibid.

²⁸¹ Ibid.

²⁸² Ibid.

beta of debt is zero. However, due to the implicit government guarantees, depositor insurance and the 'too big to fail' subsidiary, one could argue that debt is close to being risk free for the banks in this sample, if the governments are able to bail-out banks if necessary.

STATA was then used to regress the banks betas on the banks leverage ratio.

$\beta_{Equity,i,t} = a + b \times leverage + T + \varepsilon_{i,t}$

The data used is monthly data from 2006 to 2012 for the 25 banks in the sample. T is a year dummy, a is the constant and ε is the error term, which is affected by the banks, *i*, and time, *t*. Leverage is calculated as total assets over Tier 1 capital. Tier 1 capital is used, as it is interesting to investigate how the required rate of return on equity is affected by a change in leverage²⁸³. To get a purer measurement of equity, one could use Core Tier 1 capital, however, as this thesis focuses on Tier 1 capital, then the effect on the required rate of return on Tier 1 capital is interesting²⁸⁴. In addition, Miles et al. (2012) also uses Tier 1 capital instead of Core Tier 1 capital. Further, Miles et al. (2012) believes that Core Tier 1 and Tier 1 capital moves closely together. Thus, it is believed that one can use Tier 1 capital to analyse the effects of how the required rate of return on equity is affected by a change in the leverage ratio²⁸⁵. The time dummies are included to capture the impact of time trends, i.e. to control for changes in beta that is only explained by time factors, such as a financial crisis²⁸⁶. One has to control for the time effect, so a general decrease in beta, due to a time general effect, should not be attributed to the independent variables²⁸⁷. The regression could have included return on assets, i.e. ROA, or loan losses, as these factors could have an effect on the risk of the banks' assets over time, i.e. impact the asset beta²⁸⁸. However, as Miles et al. (2012) have not included them and they are not included in M&M's theory they will not be included in this regression either. Thus, asset beta is assumed to be the coefficient of leverage in the regression. the

Firstly, a Hausman test is ran to see if one should use a Fixed Effect (FE) model or a Random Effect (RE) model. The Hausman test indicates if the idiosyncratic error term is uncorrelated with the explanatory variables or not²⁸⁹. The advantage of using FE is that the parameters are consistent even though the independent variables are correlated with bank specific effects²⁹⁰. The model takes bank

286 Wooldridge (2009)

²⁸³ Miles et al. (2012)

²⁸⁴ Ibid. 285 Ibid.

²⁸⁷ Ibid.

²⁸⁸ Miles et al. (2012)

²⁸⁹ Porter & Gujarati (2009)

²⁹⁰ Miles et al. (2012)

specific effects into account, such as better management or a more profitable business model. The parameters in the RE model are only consistent if the bank specific effects are independent from the independent variables²⁹¹. However, it would make sense if factors such as better management or a better operating bank would affect the independent variables and thereby the dependent variable. The Hausman test is applied to make sure both the FE and RE coefficients are efficient²⁹². The null hypothesis of the Hausman test is that the coefficients of the two models are the same and efficient, and the alternative hypothesis is that fixed effects are correlated with the independent variables²⁹³. The chi-square is 21.82, see appendix 14. Thus, the null hypothesis can be rejected on a 1% significance level, as the p-value is 0. The RE model is thus subjected to unobserved heterogeneity bias and can therefore not be used²⁹⁴. The FE model will therefore be applied, as expected, due to the independent variables being correlated with fixed effects. Miles et al. (2012) reaches the same conclusion.

A level regression of leverage and time dummies on beta is now run using fixed effects, see appendix 14. The coefficient for leverage is -0.003, with a p-value of 84.8%. This means that if leverage increases then the equity beta will decrease slightly, i.e. the equity risk decreases when leverage increases. One would have expected a positive relationship between beta and leverage. However, the coefficient is close to zero. Miles et al. (2012) also gets a low but positive coefficient for leverage. One should notice that leverage is not significant on a 5% significance level. The fact that the coefficient is, as low as it is, is not necessarily incorrect, as Miles et al. (2012) argues that most of banks' assets are fixed income claims, thus assets are expected to have low betas. Furthermore, one should notice that the time dummies have negative coefficients and are significant, due to their low p-values. This means that the general level of equity beta is lower compared to 2012, which is the reference year. The fact that the coefficients are significant indicates that there has been a general time trend, which has affected the equity beta negatively, i.e. like the Financial Crisis. Furthermore, one should also be aware that the overall R-squared is only 0.19, which is low as leverage only explains 19% of the variability in beta. The constant, a, is positive and significant, which indicates that M&M's theory in combination with CAPM does not hold, as it was expected that leverage would decline linear with beta with no constant²⁹⁵. The coefficients will now be used to assess how a

²⁹¹ Miles et al. (2012)

²⁹² Wooldridge (2009) 293 Porter & Gujarati (2009)

²⁹⁴ Wooldridge (2009)

²⁹⁵ Miles et al. (2012)

decrease in leverage will affect the bank's return on equity and WACC, thus, the extent of M&M's theory.

Miles et al. (2012) assumes that the beta of debt is zero, so the costs of debt will equal the risk free rate. The same assumption is made in this thesis. Nonetheless, it is noted that this is a big assumption, as a bank's WACC will most likely increase when the bank decreases its leverage because equity funding is more expensive than debt funding²⁹⁶. One can rewrite the regression into the CAPM equitation as follows

$$R_{Equity} = r_f + (a + b \times leverage)R_{Premium}$$
$$(a + b \times leverage) = \beta_{Equity}$$

a is the constant and *b* is the coefficient of leverage from the above regression. As the coefficient of leverage is negative, then it implies that less leverage will increase the required rate of return on equity, which is the opposite of what M&M argues. This is also the opposite of what Miles et al. (2012) finds. As mentioned earlier the risk free rate, in this thesis, is the German 10-year government bond with an effective rate of 1.316%. The average level of leverage for all the banks in the sample from 2006 to 2012 is 29.7, however, this will be rounded up to 30 in order to make the calculations more intuitive. Miles et al. (2012) uses an average level of leverage of 30 as well. The equity risk premium used in this thesis is 7.59%, which was what Aswath Damodaran estimated the average equity risk premium to be for the European countries in 2013. When inserting the coefficients of a and b, from the regression²⁹⁷ and the above numbers, the required rate of return on equity can be calculated

$$R_{Equity,full\ leveraged} = 1.316\% + (2.03 - 0.003(30)) \times 7.59\% = 16.04\%$$

The average required rate of return on equity has been $15\%^{298}$, thus, the above estimated required rate of return on equity seems plausible. The average level of leverage, in the sample, was 30, thus, the equity-to-value ratio is E/(D+E), i.e. 1/30, and the debt-to-value is D/(D+E), i.e. $29/30^{299}$. Therefore the WACC is

$$WACC_{full \, leveraged} = R_{Equity} \times \frac{D}{(D+E)} + R_{Debt} \times \frac{D}{(D+E)} \to 16.04\% \times \frac{1}{30} + 1.316\% \times \frac{29}{30}$$

= 1.81%

²⁹⁶ Miles et al. (2012)

²⁹⁷ See appendix 14 for the coefficients 298 Miles et al. (2012)

²⁹⁸ Miles et 299 Ibid

Miles et al. (2012) finds a somewhat higher WACC of 5.33%, which is because they use a risk free rate and risk premium of 5%. If one now halves the leverage from 30 to 15, which is more or less the effect of the new capital requirements, from a Tier 1 capital of 4% to minimum 8.5%, while keeping the asset composition constant, then the required rate of return on equity increases to

 $R_{Equity,half\ leveraged} = 1.316\% + (2.03 - 0.003(15)) \times 7.59\% = 16.38\%$

However, WACC increases to

$$WACC_{half \ leveraged} = R_{Equity} \times \frac{D}{(D+E)} + R_{Debt} \times \frac{D}{(D+E)} \to 16.38\% \times \frac{1}{15} + 1.316\% \times \frac{14}{15} = 2.32\%$$

If M&M's theory holds 100% then the change in leverage should not have an effect on WACC and a decrease in leverage should decrease the required rate of return on equity. The difference between the two calculated WACC's are 51 basis points³⁰⁰. Thus, if M&M is present then WACC will increase with 51 basis points when leverage is halved³⁰¹. If one assumed that M&M's theory is not present and the required rate of return on equity stays unchanged when leverage is halved, then the WACC would be

$$WACC_{no\,M\&M} = R_{Equity} \times \frac{D}{(D+E)} + R_{Debt} \times \frac{D}{(D+E)} \to 16.04\% \times \frac{1}{15} + 1.316\% \times \frac{14}{15} = 2.3\%$$

The difference between the WACC with no M&M and the WACC with full leverage is 49 basis points. Thus, if M&M is not present then WACC will only increase with 49 basis points, when leverage is halved³⁰². Miles et al. (2012) then argues that if one takes the differences between the two results, i.e. $\left(1 - {\binom{51}{49}}\right) \times 100 = -4.08\%$, then -4.08% indicates the effect of M&M, see appendix 15 for the calculation. Thus, if M&M is present then the WACC will be less than it would be if M&M were not present. The WACC might be lower if M&M is present, because M&M does not take taxes, bankruptcies cost, government guarantees, 'too big to fail' subsidiary or depositor insurance into account. Thus, these simple calculations suggest that M&M's theory does not hold 100%. However, the regression might suffer from non-stationarity.

^{300 2.32-1.81 = 51} basis points

³⁰¹ Miles et al. (2012)

³⁰² Ibid.

A Fisher-type unit root test is now conducted in STATA on beta and leverage to check for stationarity, see appendix 14. The null hypothesis of the Fisher-type unit root test is that all panels are non-stationary³⁰³. The alternative hypothesis is at least one is stationary³⁰⁴. The reason why one should be aware of whether or not the regression is stationary is due to the risk of a spurious regression³⁰⁵. This test is based on the Augmented Dickey-Fuller (ADF) test, which means that it takes into consideration that the error term can be correlated with itself over time, thus, that the error term is not white noise³⁰⁶. The ADF regression includes a time trend, one lag and removes the cross-sectional mean³⁰⁷. The p-value, when looking at the value of the chi-squared, for both beta and leverage is zero. Thus, the null hypothesis can be rejected on a 1% significance level. The panels are therefore stationary. The regression is therefore not spurious. One would have assumed that the data was stationary, due to the limited sample. Miles et al. (2012) also rejects the null hypothesis of the unit root test, but still runs the regression with first difference. The power of the test is mostly likely low, due to the limited sample size³⁰⁸. Thus, even though the panels are stationary, Miles et al.'s (2012) approach is followed and the first difference of beta and leverage is taken.

Thus, the first difference of beta and leverage is taken and the regression is run again with fixed effects, see appendix 14 for the results. The leverage coefficient is now 0.00079, thus positive but insignificant at a 5% significance level, as the p-value is 95.6%. The asset beta is now positive, which is more along the lines one would expect. However, the low value is still not surprising, due to the above argument of the size of asset beta in the level regression. The coefficient of the constant, *a*, has decreased significantly from 2.03 to 0.59, but the coefficient is still significant at a 5% significance level. The coefficients for the time dummies are mostly negative and highly significant. Thus, the beta is still negatively influenced by a time trend, compared to the value of beta in 2012. The time dummy for 2009, i.e. time 4, has a positive coefficient but is now insignificant at a 5% significance level. The beta in 2009 therefore seems higher than the level of beta in 2012, which can be explained by the time trend, as more risk might have been associated with the banks' stocks in 2009 compared to 2012. The time dummy for 2008, i.e. time 3, is also insignificant. The time dummy for 2006, i.e. time 1, has now been omitted, because of multicollinearity. This could be due to the limited amount of years and banks, i.e. the sample size. Multicollinearity is when more of the time dummies have a

³⁰³ Gujarati & Porter (2009)

³⁰⁴ Ibid.

³⁰⁵ Ibid. 306 Ibid.

³⁰⁷ Miles et al. (2012)

³⁰⁸ Gujarati & Porter (2009)

mutual relationship. STATA removes the variable if the relationship is too strong³⁰⁹. The R-squared is still low, as leverage only explains 24.72% of the variation in beta. However, it has increased from the previous regression.

The same approach, as previously, is used in order to determine the extent of presence of M&M. Firstly the new regression coefficients are plugged into the equation below in order to determine the new required rate of return on equity. The risk free rate and risk premium are the same and the average level of leverage is the same as previously, i.e. 30.

$$R_{Equity,full\ leveraged} = 1.316\% + (0.59 + 0.00079(30)) \times 7.59\% = 5.97\%$$

The required rate of return on equity in now 5.97%, which is substantially lower than the previously return on equity, which was 16.04%. The WACC can now be calculated, which is shown below

$$WACC_{full \ leveraged} = R_{Equity} \times \frac{D}{(D+E)} + R_{Debt} \times \frac{D}{(D+E)} \to 5.97\% \times \frac{1}{30} + 1.316\% \times \frac{29}{30}$$

= 1.47%

The new WACC, using the new return on equity, is substantially lower than previously.

The leverage is now halved from 30 to 15 in order to investigate the effect on the required rate of return on equity. The return on equity will be calculated using the new regression coefficients and a leverage of 15.

$$R_{Equity,half\ leveraged} = 1.316\% + (0.59 - 0.00079(15)) \times 7.59\% = 5.88\%$$

The return on equity decreases when leverage is halved. When using the level regression coefficients the return on equity increased when leverage was halved. The decrease is due to the new positive coefficient of leverage. The decrease in the return on equity is consistent with M&M's theory. WACC is now calculated by using the new return on equity and a leverage of 15.

$$WACC_{half \ leveraged} = R_{Equity} \times \frac{D}{(D+E)} + R_{Debt} \times \frac{D}{(D+E)} \to 5.88\% \times \frac{1}{15} + 1.316\% \times \frac{14}{15} = 1.62\%$$

One can see that WACC increases when leverage is halved, which was the same trend as one saw earlier. If one assumes that M&M's theory holds 100% then WACC should have stayed unchanged. The difference between the WACC with full leverage and the WACC with half the leverage is 15

³⁰⁹ Gujarati & Porter (2009)
basis points³¹⁰. This indicates that if M&M is present then WACC will increase with 15 basis points when leverage is halved. This is a much smaller increase than previously where the difference was 51 basis points. Thus, when using the new regression coefficients the effect on WACC when M&M is present is smaller.

If one now assumes that M&M's theory is not present, which Miles et al (2012) shows by assuming that return on equity stays unchanged when the level of leverage is halved, which one can criticise as the lack of presence of M&M does not necessarily mean that the return on equity will stay unchanged. However, as Miles et al.'s (2012) approach is used, this assumption is used too, but one should be aware that it might be an unrealistic assumption, since one would believe the return on equity would change when the level of leverage changes. The WACC with no M&M is as follows

$$WACC_{no\,M\&M} = R_{Equity} \times \frac{D}{(D+E)} + R_{Debt} \times \frac{D}{(D+E)} \to 5.97\% \times \frac{1}{15} + 1.316\% \times \frac{14}{15} = 1.63\%$$

The difference between WACC with no M&M and the WACC with full leverage is 16 basis points³¹¹. Thus, if M&M is not present then WACC will increase with 16 basis points when leverage is halved, whereas if M&M is present the WACC will increase with 15 basis points. Hence, the effect on WACC is larger than when M&M is not present. This is consistent with the trend Miles et al. (2012) finds. This trend makes more sense, than the results using the level regression coefficients. This indicates that the regression using the first differences is more precise than the level regression. Miles et al. (2012) now calculates the extent of M&M by taking the difference of the basis points $\left(1 - \left(\frac{15}{16}\right)\right) \times 100 = 6.25\%$, see appendix 16. Thus, based on Miles et al.'s (2012) approach and the above first difference regression, the calculations show that the effect of M&M is 6.25%. Thus, the WACC is higher when M&M is not present.

Until now, taxes have not been taking into consideration because Miles et al. (2012) do not take taxes into account. If one uses the above coefficients of the level and first difference regressions and halves the leverage the effect with taxes are -4% using the level regression and 3.66% using the first difference regression, see appendix 17. These effects were calculated by using the same required rate

^{310 1.62-1.47= 15} basis points

^{311 1.63 - 1.47 = 16} basis points

of return on equity equation, but by changing the WACC equation to

 $WACC = R_{Equity} \times \frac{D}{(D+E)} + R_{Debt} \times \frac{D}{(D+E)} \times (1 - tax)$. The tax rate is assumed to be 20.42%, which is the average tax rate in Europe in 2012³¹².

The effect of M&M with taxes, using the level regression, is 0.08 percentage points less than when not taking taxes into considerations. The effect of M&M with taxes, using the first difference regression, is 2.59 percentage points less with taxes. Hence, taxes further limits the effects of M&M.

Thus, based on the sample and the level and first difference regressions it can be concluded that the effect of M&M is between -4.08% and 6.25% without taxes and -4% and 3.66% with taxes. Thus, the effect of M&M is roughly 0%, hence, the effect of M&M is fairly small. It can therefore be concluded that one can expect M&M not to be significantly present, i.e. capital structure has an effect on banks' value. The effects of including taxes do not significantly alter the conclusions. Thus, a bank's required return on equity, funding cost and valuation are expected to be affected by a change in the capital structure. Miles et al. (2012) estimates the effect of M&M, with no tax, to be between 40% and 90% based on a level and first difference regression respectively. Miles et al. (2012) do not calculate the effect with taxes. Thus, the estimated effect of M&M is substantial smaller than what Miles et al. (2012) estimates. The reason for the difference could be due to the sample, i.e. Miles et al. (2012) only focuses on UK banks and in the time period of 1992 to 2010. However, many of the changes and trends are similar.

Nonetheless, one should be aware that this conclusion is based on a small sample size and only for European banks from 2006 to 2012. Furthermore, the used approach is simple and makes many significant assumptions, which one could criticise. The critical assumptions are, among others, that the return on debt is assumed to stay unchanged when leverage is altered³¹³, that with no M&M the return on equity is assumed to stay unchanged, when leverage changes, and lastly that bankruptcies costs and other market imperfections are not taking into considerations. Hence, one should understand the conclusion within the frame of which the conclusion was reached.

Based on the above findings it is interesting to investigate what the effects of the new capital

³¹² KPMG I

³¹³ Which causes the M&M effects to be potentially underestimated.

requirements actually are on banks. From the theoretical discussion of the effect of the new capital requirements, it is evident that there are many factors in a bank's financial statements that are assumed to be affected by a change in the capital structure.

7.3.2 A Simple Model

It is difficult to estimate what exactly will happen to the banks' financial statements when the capital requirements are changed, and scholars certainly do not agree³¹⁴. It is important to understand and estimate the precise effects of a change in capital requirements, as if one does not understand these effects then one cannot estimate the effects on valuation. Thus, it is important that one understands how capital requirements affect banks. There is no doubt that the effects and correlations between the capital requirements and the valuation is a complex interaction of many forces. In order to clarify the effect of the capital requirements a simple model, with only relevant effects, will be analysed. Lastly, all necessary assumptions and important elements will be summed up, so one is ready for the valuation analysis.

7.3.2.1 Lending Rate

What follows is a walkthrough of how the capital requirements affect banks' financial statements and lending rates, in a simplified manner.

Lending Rate Calculation

| Loan | € | 1,000,000.00 |
|---|---|--------------|
| Risk Weight | | 2 |
| Weight al Ratio Requirement ired capital ired earnings on Required Capital is 15% (ROE) ing costs inistrative Costs | € | 2,000,000.00 |
| | | |
| Capital Ratio Requirement | | 11% |
| Required capital | € | 220,000.00 |
| | | |
| Required earnings on Required Capital is 15% (ROE) | € | 33,000.00 |
| Funding costs | € | 30,070.00 |
| Administrative Costs | € | 10,000.00 |
| Needed Income to Lend | € | 73,070.00 |
| Lending rate | | 7.307% |

Source: Bankscope, Bloomberg, Nordea, own calculations

³¹⁴ Admati et al. (2011)

One can start by calculating a simplified lending rate. Let us assume that a given company wants to borrow €1 million from a bank. For the sake of the argument, assume that the bank has a risk weight of two, which is not unrealistic for a company with a B3 credit rating³¹⁵. The risk-weight is a result of complex calculations, which are outside the scope of this project, and will therefore not be described in detail here. The risk-weighted assets (RWA) are €2 million, which is calculated by multiplying the risk-weight with the loan amount. Further, let us assume that the capital requirements, i.e. the Tier 1 ratio, is 11%, which includes the Core Tier 1 Capital, the Additional Tier 1 Capital, the capital conservation buffer, a countercyclical buffer of 1% and a SIFI buffer of 3%. The amount of required capital the bank then needs to keep, in order to facilitate this loan, is 11% of the €2 million in RWA, which is €220,000. Thus, the bank needs to keep €220,000 in equity in order to facilitate this loan on €1 million to the company. Since a bank profits from lending money, then a bank needs to have sufficient equity, as the bank has to keep a percentage of the loaned amount as a buffer. However, investors will only provide equity to the bank, if the return on equity is high enough, i.e. if the investment is attractive. Thus, a bank sets a bank specific required earnings ratio, which the banks need to earn on the loan to make investors satisfied. This is bank specific and depends on what the specific bank needs/wishes to earn on its equity, and thereby on all its total loans. What a bank has to earn on a loan is often the same or higher than the ROE. For example, Danske Bank aims to have a ROE, of 12%³¹⁶, and Nordea aims to have a ROE of 15%³¹⁷. If a bank earns less than ROE on each loan, then the bank is not able to reach the overall ROE for all its equity. If a bank does not meet its ROE, then investors may be unsatisfied and pull the equity out of the bank or not provide more equity to the bank.

For the sake of the argument, one can assume that this bank has a required earnings ratio of 15%. This means that the bank has to earn €33,000 on the €1 million loan, as the required earnings amount is calculated by multiplying the required earnings ratio with the required capital. Furthermore, the funding rate the bank is able to borrow at, in the market, is also bank specific, and depends, amongst other, on the yield curve, i.e. the maturity, bank specific risks and the credit rating of the bank³¹⁸. The average funding cost of the sample banks for 2012 were 3.007%, which is used in this example, see appendix 18 for all the banks' funding costs in 2012. Thus, the cost of funding this loan is 3.007% of

³¹⁵ See appendix 31

³¹⁶ Danske Bank II

³¹⁷ Bloomberg I

³¹⁸ Craig & Dinger (2013)

€1 million. Lastly, there are administrative costs on the loan, which in this example is assumed to be €10,000. Thus, the needed income to lend €1 million is €73,070, i.e. the sum of the required earnings, funding costs and administrative costs. Thus, the lending rate on the loan is therefore 7.307%, in order for the bank to earn 15% on the loan.

However, there is also a cost of facilitating the loan on the bank's balance. The cost on the balance is the lend amount multiplied with the risk weight multiplied with the capital ratio requirement, i.e. in this case the Tier 1 ratio. For example, for a bank to issue a \in 1 million loan, with a risk-weight of two and a Tier 1 ratio of 11%, the bank has to keep the following in equity,

$Equity = Loans \times RW \times Tier \ 1 \ Ratio \ \rightarrow 1 \ million \ \times \ 2 \ \times \ 11\% = \pounds 220,000$

Thus, if the bank has $\notin 200,000$ in equity, then it does not have the necessary equity to facilitate the loan. However, if the bank has $\notin 500,000$ in equity, then the bank is able to facilitate the loan. The more equity a bank has the more loans it can facilitate. If a bank does not have the necessary equity, then it has to ask the investors for more equity, however, if they are not willing to provide more equity, the bank can build up more equity by keeping the profit as retained earnings until the amount of equity is large enough to facilitate the loan. If neither of these methods work then the bank can simply not facilitate the loan.

If the capital requirements now increase from 11% to 20%, then the effect will be as follows.

Figure 10: Lending Rate Calculation, 20% -ratio

Lending Rate Calculation

| Loan | € | 1,000,000.00 | |
|--|----------------|--------------|--|
| Risk Weight | | 2 | |
| RWA | € 2,000,000.00 | | |
| | | | |
| Capital Ratio Requirement | | 20% | |
| Required capital | € | 400,000.00 | |
| | | | |
| Required earnings on Required Capital is 15% (ROE) | € | 60,000.00 | |
| Funding costs | € | 30,070.00 | |
| Administrative Costs | € | 10,000.00 | |
| Needed Income to Lend | € | 100,070.00 | |
| Lending rate | | 10.070% | |

Source: Bankscope, Bloomberg, Nordea, own calculations

If one continues to assume that a company would like to borrow $\in 1$ million and the risk weight is unchanged then the total RWA has not changed. However, the required capital is now $\in 400,000$, i.e. the bank has to keep much more equity in order to facilitate this loan. This result in the cost of facilitating this loan has increased. The required earnings ratio is assumed constant, as it is assumed that the bank wants to earn as much on the loan as they did previously. The bank now has to earn $\in 60,000$, on the loan, in order to keep investors satisfied. However, the required earnings ratio as a percentage of ROE might increase as the amount of equity increases. An interview as well as mail correspondence was conducted with Bjørn Alsen, Head of Balance Sheet Management, Group Treasury at Nordea³¹⁹. Bjørn agrees with Baker and Wurgler (2013)³²⁰, and argues that the whole dilemma is that banks will always strive to obtain a ROE that is larger than the cost of equity³²¹. Thus, the banks can only increase ROE if it increases its lending rates to its customers, because of increasing cost, due to the higher capital requirements. Nonetheless, the required earnings ratio is for simplicity assumed constant in this example.

Furthermore, if one assumes that the funding costs the banks borrow at in the market stays unchanged, then the funding cost of the loan has not changed either. However, it is unrealistic to assume that the

³¹⁹ See Appendix 30 for the mail correspondence and USB key for the interview

³²⁰ Cited in Rangvid (2013)

³²¹ Appendix 30

funding costs will stay unchanged if the capital ratio increases. One would expect that safer banks, i.e. banks with higher capital ratios, would fund themselves cheaper in the market. Nonetheless, banks with high credit ratings might not be able to fund themselves cheaper in the market, when their capital level is increased, as there might be a limit to how cheaply a bank can fund at³²². For simplicity, let's assume that funding costs are unchanged. One can further assume that the administrative costs of the loan will stay unchanged. Thus, the needed income to lend has now increased to €100,070. Thus, it is now more expensive for a bank to facilitate the loan. The bank can now inform all its customers that the lending rate on their loans have increased from 7.307% to 10.070%. However, if the bank is not able to pass on the higher cost of the loan on to the customers, due to higher capital requirements, then it will cost the bank 73,070 - 100,070 = €27,000. The bank might be able to increase the lending rate paid by retail customers, as they do not have any real bargaining power, as discussed in section 7.1.2. However, the bank might not be able to increase the lending rate on all loans, as some contracts make it impossible for banks to increase the rate. Further, corporate customers might not be willing to pay a higher interest on the loan, so they might go to another bank, use the capital markets, as a substitute, or not lend at all. Whether a corporate customer will pay the higher interest depends on a number of things, but amongst other, could depend on the customers loyalty, trust and perceived quality of the service etc.³²³. However, if the bank cannot pass on the costs of the higher capital requirements on to the customers, then it will increase the bank's cost of facilitating the loan, and thereby decrease the profit, all else equal.

With the higher capital requirements the bank has to hold €400,000 in equity

$Equity = Loans \times RW \times Tier \ 1 \ Ratio \rightarrow 1 \ million \ \times \ 2 \ \times \ 20\% = \pounds 400,000$

If the bank does not have $\notin 400,000$ in equity, the bank cannot facilitate the loan. If the bank has more than $\notin 400,000$ in equity, then the bank is able to facilitate the loan. Thus, the more equity a bank has on its balance, the more loans it can facilitate, and the more money the bank can earn.

It is crucial to understand that higher capital requirements increase the costs of facilitating the loans, and thus, requires more equity to facilitate the loans. The requirements do neither increase the lending rate nor required earnings, as it is the bank's management that increases the lending rate

³²² Bloomberg IV

³²³ Ernst & Young I

and required earnings.

Lastly, Kashyap et al. (2010) finds that banks pass the higher costs of more equity on to the customers, as they empirically show that the lending rates increases with 2.5 to 4.5 basis points when the capital ratio is increased with 1%. From the above, simplified example, the estimated increase in the lending rate was 37 basis points³²⁴, when the capital ratio was increased with 1%. This shows that even though one cannot read too much into the results of the simple model, it is along the same lines as Kashyap et al.'s (2010) findings, even though it was just a simple model. Bjørn from Nordea, agrees with Kashyap et al. (2010) and argues that the lending rate is expected to increase in order to compensate for the additional expenses the banks' acquire when the capital requirements are increased³²⁵. However, Bjørn also states that the lending rate will only increase if the competition in the banking industry allows the banks to pass on the costs to the customers³²⁶. As was analysed in section, 7.1.2, it seems as if banks cannot simply increase the lending rate to corporate customers but might be able to increase the lending rate to some retail customers.

Even though the capital requirements do not directly increase the lending rates then the management team might. Thus, the lending rate will be included in the scenario analysis, as it is a result of the higher costs caused by the capital requirements. Further, the lending rate is included, due to the impact higher lending rates has on banks' valuation, i.e. higher lending rates leads to higher interest income, if the lending amount is assumed constant. This leads to higher NII, if borrowing rates and borrowing amounts are assumed constant, which will lead to higher earnings and thereby higher values for the banks, all else equal. The lending rate is assumed to increase when the Tier 1 ratio increases, i.e. it is assumed that the banks are able to pass on the higher costs. The effect of higher capital requirements on the banks' lending rates will be assumed to be 3.5 basis points, based on Kashyap et al.'s (2010) findings. Hence, for every one percentage point increase in the Tier 1 ratio the lending rate will increase with 3.5 basis points, i.e. 0.035%, in the scenario analysis.

7.3.2.2 Borrowing Rate

From the above analysis it was clear that higher capital ratio requirements affected the bank's required amount of capital, thereby costs and the bank's amount of equity. The borrowing rate was assumed

^{324 (10.070-7.307)/(20-11)=0.37%}

³²⁵ Appendix 30

³²⁶ Ibid.

constant in the above analysis. However, one might assume that the cost of borrowing money in the market would decrease with higher capital requirements. Bjørn from Nordea argues that one would expect that the general costs of senior unsecured funding would decrease, i.e. the CDS spreads would decrease, as the bank gets safer³²⁷. Nonetheless, the funding costs on covered bonds are not expected to change when the capital requirements are increased, as they are priced off the quality of the mortgage pool³²⁸.

Thus, it is not unrealistic to assume that senior unsecured funding will change when the capital requirements are increased. The figure below shows a clear relationship between the Core Tier 1 ratio and senior unsecured funding rate. The effect of higher capital requirements on banks' valuation is clearer when going through the borrowing rate. The capital ratio affects the funding rate downward, which decreases the interest expenses, if keeping the borrowed amount constant. This leads to an increase in NII, if keeping the lending rate and lending amounts constant, which leads to higher earnings. This leads to a higher overall value of the bank, all else equal. Thus, through the funding rate it is clear how higher capital requirements affect banks' valuation. The following figure shows the relationship of senior unsecured funding and the Core Tier 1 ratio.

³²⁷ Appendix 30 328 Ibid.





 Anm.: Afkastkrav til seniorgæld er beregnet ud fra CDS-spænd. Figuren viser sammenhængen i 2012 for en gruppe store europæiske pengeinstitutter.
Kilde: Bloomberg og egne beregninger.

Source: Nationalbanken (2013)

The vertical axis shows the senior unsecured funding rate and the horizontal axis displays the Core Tier 1 ratio. Unless started otherwise, the senior unsecured funding rate, funding rate and borrowing rate will be used interchangeably.

The above figure clearly shows the downward effect of a higher Core Tier 1 ratio on senior unsecured funding. Thus, the figure indicates that a higher Core Tier 1 ratio leads to lower funding rates. Senior unsecured funding is the source of funding most sensitive to risk, and thereby most affected by higher capital levels. It thereby shows the clearest correlation between funding, capital requirements and valuation³²⁹. This source of funding is more sensitive to risk, as this type of funding is not covered by the government guarantee fund. Since the funding is not secured, i.e. no assets are used as collateral it is the banks' risk of default that influence the funding rates³³⁰. The figure indicates that when the Core Tier 1 ratio increases, then the funding cost will decrease. When funding costs decrease then interest expenses decrease as well, which will increase the NII, if the borrowed amount and interest income are held constant. When the NII increases, then earnings will increase, which will result in

³²⁹ Interview with Nordea, USB Key

³³⁰ The Nest I

the value of the bank to increase, ceteris paribus. Higher capital levels decrease the funding costs, because of the lower risk the bank then face³³¹. The investors will therefore require a lower rate of return, which decrease the funding rate³³². This is because, as seen in the above lending rate section 7.3.2.1, the higher capital requirements will cause the amounts of equity to increase. When the banks' amounts of equity increase, then the banks have a larger capital buffer to resist future financial crises and loan losses. If a bank is more robust then the investors are assumed to believe that the probability of the bank going bankrupt is low, which will decrease the risk of the bank³³³. The investors will therefore require a lower rate of return, which will decrease the bank's borrowing rate³³⁴. Thus, it seems that higher Core Tier 1 ratios lead to lower funding costs, which will influence the banks' valuations through market mechanisms, as it is believed that the market, among others, value banks based on risk and earnings³³⁵.

From the above figure it is evident that if the Core Tier 1 ratio increases from 12% to 15%, then the funding costs will decrease with 20 basis points. Further, it seems that if the Core Tier 1 ratio increases from 12% to 13% then the funding costs will decrease with 10 basis points. Furthermore, the above figure clarifies how important risk is when valuing banks, as it affects the banks' borrowing rates. In addition, it is clear how bank-specific the relationship between the Core Tier 1 ratio and funding rates are, otherwise all the banks would be on the same line.

In order to investigate the relationship of funding costs and higher capital requirements, for this thesis' sample, a regression in SAS has been run. The following regression was run

$Funding_{i,t} = Tier \ 1 \ ratio + Rating + Beta_{equity} + Leverage + ROA + ROE + \varepsilon_{i,t}$

The regression was run with data from 2012, in order to compare the numbers with the above figure 11. The funding costs for each bank was calculated based on each banks' total interest expenses on their debt securities in issue over their total amount of debt securities in issue. These figures were found in the banks' individual annual reports from 2012. The rating for each bank was read of Moody's online database. The equity beta had already been calculated, as it was calculated when

³³¹ Kashyap et al. (2010)

³³² Ibid. 333 Ibid

³³⁴ Ibid.

³³⁵ Damodaran I

determining the effect of M&M's theory. These equity betas were used, see appendix 13. The leverage ratio was calculated by dividing total assets over equity based on figures from Bankscope. The return on assets, ROA, for each bank was calculated by dividing net income over total assets, which was also based on figures from Bankscope. The ROE for each bank was calculated by dividing net income over equity, which was based on accounting figures from Bankscope. All these independent variables, except for the Tier 1 ratio, were included in the regression as control variables, as they were expected to have an effect on funding, however, the main variable of interest was the coefficient of the Tier 1 ratio. In order to see all the input data, see in appendix 19.

The output from the regression can be seen in the following figure 12



Figure 12: SAS Output

Source: Bloomberg, Bankscope, the banks' annual reports from 2012, own calculations

Based on the above SAS output, the coefficient of the Tier 1 ratio variable was -0.127 and highly significant at a 5% significance level, as the p-value was 0.006. Thus, according to the regression a one percentage point increase in the Tier 1 ratio, i.e. from higher capital requirements, would decrease the funding costs with 0.127%. Thus, the regression indicates that the funding rate will decrease,

which is in accordance with M&M's theory and the findings from the above figure 11, developed by the Danish National Bank. One should notice, that the Danish National Bank used senior unsecured funding and the Core Tier 1 ratio and this regression used debt securities in issue and the Tier 1 ratio. These are significant differences, which indicates that one should be careful when comparing the results. The problem with using debt securities in issue, instead of senior unsecured debt, is that not all the elements in debt securities in issue are as risk sensitive as senior unsecured debt. Thus, it is not incorrect to use debt securities in issue, however the variable is not as sensitive to changes in capital requirements. Nevertheless, the findings are consistent and the findings from the regression seem plausible. The coefficient of the Tier 1 variable is used in the scenario analysis by multiplying the decrease in risk. Through this approach the risk and borrowing rate are included in the scenario analysis.

The effect of including the decreasing borrowing rate can be seen in the following simplified example Figure 13: Lending Rate Calculation, Comparison

| Loan | € | 1,000,000.00 | € | 1,000,000.00 |
|--|---|--------------|-----|--------------|
| Risk Weight | | 2 | | 2 |
| RWA | € | 2,000,000.00 | € | 2,000,000.00 |
| | | | | |
| Capital Ratio Requirement | _ | 11% | 20% | |
| Required capital | € | 220,000.00 | € | 400,000.00 |
| | | | | |
| Required earnings on Required Capital is 15% (ROE) | € | 33,000.00 | € | 60,000.00 |
| Funding costs | € | 30,070.00 | € | 18,640.00 |
| Administrative Costs | € | 10,000.00 | € | 10,000.00 |
| Needed Income to Lend | € | 73,070.00 | € | 88,640.00 |
| Lending rate | | 7.307% | | 8.864% |

Lending Rate Calculation

Source: Bankscope, Bloomberg, Nordea, own calculations

If all the numbers from the example in section 7.3.2.1 are held constant, except for the funding costs, which is now *Funding costs* = 0.03007 - (0.00127 * 9) = 1.86%, when the capital ratio requirements are 20% and 3.007% when the capital ratio requirements are 11%. Then the needed income to lend in order to facilitate the loan will still increase, however, not by as much as previously. The lending rate to the customers will now be 8.864% compared to 10.07% as it was previously.

Based on the above analysis, it is clear that higher capital requirements affect the banks' risk, thereby funding rate and lastly the banks' value. It is therefore essential, for the scenario analysis that the lower borrowing rates are included when the capital ratio levels are increased. Based on the above analysis and regression analysis the borrowing rate is assumed to decrease with 0.127% when the Tier 1 ratio increases with one percentage point. Hence, the change in risk when the capital ratio is increased is included indirectly in the scenario analysis through the decrease in the borrowing rate.

7.3.2.3 Required Rate of Return on Equity

One would expect the required rate of return on equity to decrease with higher capital requirement levels. It was clear from the above lending rate section, 7.3.2.1, that higher capital requirement levels increased the amount of equity. When the amounts of equity increases then the banks have bigger capital cushions to resists future crises and loan losses. This makes the banks less risky, which decreases their beta and their market risk premium. This will decrease the required rate of return on equity, if the risk free interest rate is held constant.

However, Baker and Wurgler (2013) have shown, that even though it should be as stated, the actual behaviour of stockholders is not consistent with theory. They have shown that the required rate of return on equity does not decrease proportionally with the decrease in risk³³⁶. This is consistent with the findings from the above M&M analysis, section 7.3.1. It was clear that the required rate of return on equity increased when leverage was halved in the level regression. However, the required rate of return on equity decreased when leveraged was halved in the first difference regression.

Bjørn from Nordea agrees with Baker and Wurgler (2013) and argues that even though regulators believe that when the banks are safer, due to more equity, then investors will demand a lower return, however, this has not been the case so far³³⁷. The equity investors have not yet adapted their required return to the lower risk the banks now face. Thus, equity beta has decreased because there is now less risk associated with the banks' stocks, however, the return on equity has stayed unchanged. This can be explained by an increase in the market risk premium. Investors might have demanded a too low risk premium previously maybe because they did not know the extent of risk associated with banks before the Crisis³³⁸. Thus, now the investors realise how risky banks are and thus do not decrease

³³⁶ Cited in Rangvid (2013)

³³⁷ Appendix 30

³³⁸ Sorkin (2009)

their risk premium until they perceive the risk of banks to be equivalent to the return. The fact that investors do not adjust their return affects the price the investors are willing to pay, thereby the priceearnings ratio, and the market value of the banks' equity, thereby the market-to-book ratio. Thus, the fact that investors do not adapt to the new setting, as theory subscribes, has an effect on the banks' valuation.

As the required rate of return on equity is affected by higher capital requirements, through risk, and has a significant impact on the banks' valuation it should be included in the scenario analysis. However, as the investors have not yet adapted their required rate of return then it is difficult to include this factor in the scenario analysis, as not enough empirical evidence exists.

7.3.2.4 Loan Portfolio

Raaballe (2013) argue that there has been a trend over the last couple of years of banks changing the composition of their loan portfolio to more low-risk assets from high-risk assets. High-risk assets demand a high-risk weight, which increases RWA, which increases the required capital needed to facilitate the loans, which will increase the costs of providing the loan, see the lending rate analysis section 7.3.2.1. Kashyap et al. (2010) also argues that banks will redesign their loan portfolio in order to meet the higher capital requirements, in order to limit the increasing costs of facilitating the loans. However, Bjørn from Nordea foremost argues that it is difficult for large banks to change their loan portfolio and it at least would take a long time to adjust the loan portfolios, due to long maturities on loans³³⁹. Nevertheless, there is not enough empirical evidence or theory to know how exactly the banks' loan portfolios will change when the capital requirements are increased. Thus, the changes in the banks' loan portfolios will not be a part of the scenario analysis.

7.3.2.5 Total Assets

Raaballe (2013) argue that banks have over recent years trimmed their balance. This could be due to low loan growth or a mean to meet the higher capital requirements. As stated in the theoretical discussion, Deutsche Bank, Barclays and Crédit Agricole have stated that they will decrease their balance with 20%, as a mean to meet the higher capital requirements. However, when a bank trims its balance it decreases its total assets, which is the banks' livelihood. Bjørn from Nordea argues that banks will only decrease their amount of loans, i.e. total assets, if a bank is seriously capital

³³⁹ Appendix 30

constrained³⁴⁰. Thus, it is not a sustainable method to meet the higher capital requirements but it can be the only way. As was analysed in the previous lending rate section 7.3.2.1, the higher capital requirements demand the banks to have higher required capital amounts when facilitating loans. This will lead to banks being unable to facilitate as many loans as they wish too if the bank does not have the necessary amount of capital. Therefore, one has to understand that a bank does not get more equity by trimming the balance but only a higher Tier 1 ratio.

Based on the sample banks, the average percentage change of loans, total assets and equity looks as follows



Source: Bankscope, own calculations

It is clear from the above figure that total assets and loans increased at a decreasing rate from 2007 to 2008 and that the rate was the same. Thus, the balance increased at a decreasing rate as fewer loans were facilitated. The figure shows that the average bank balance has not decreased but increased at a decreasing rate. The average total amount of loans have also risen at a decreasing rate, which indicates that the rate of loans being facilitated have decreased maybe due to the higher costs of facilitating them. The fact that the development of equity was negative in 2008 indicates how, on average, the banks in the sample needed outside capital, as their amount of equity was decreasing. It looks as if the banks raised the needed equity in 2009, as equity greatly increased in 2009. The growth in equity from 2009 to 2012 has happened at a decreasing pace. This indicates that the amount of equity has been increasing at a decreasing rate, which could indicate how difficult it was for some banks to

³⁴⁰ Appendix 30

obtain new equity. Thus, the sample banks have increased their amount of loans at a decreasing rate, increased their equity at a decreasing rate and increased total assets at a decreasing rate. Nothing points toward the average sample bank has trimmed its balance.

Thus, there is not enough evidence to back up the statement that all banks trim their balance to meet the higher capital requirements. However, the figure does indicate that banks might struggle with obtaining more equity, as the percentage change in equity should have been increasing at an increasing rate, as all the banks are forced, through CRD-IV to have more equity. Lastly, one has to remember, that when banks become less leveraged, i.e. the amount of equity increases, then unless total liabilities decreases total assets have to increase. In general, banks are assumed to be worth more when the amount of equity increase because they can then facilitate more loans and earn more money, as the simple model in section 7.3.2.1 illustrates. This is only not true, if banks instead of increasing equity decreases RWA or decreases loans in order to meet the Tier 1 ratio. Then the banks will not be more valuable. There is not enough empirical or theoretical evidence of what will happen to the banks' balance when capital requirements are increased. Total asset will therefore not be included in the scenario analysis.

7.3.2.6 Credit Rating

Lastly, the higher capital requirements are believed to increase financial stability and make banks more cushioned in case of future crises³⁴¹. Moody's base their credit rating on five parameters, which are *Risk Positioning, Regulatory Environment, Financial Fundamentals, Operating Environment and Franchise Value*³⁴². The risk position parameter looks at the banks' lending policies, its risk management, its combination of profit and risk and lastly the banks' ability to adequately report in a transparent matter³⁴³. The new CRD-IV requirements lead to more conservative lending policies and risk management. This is an element that would increase the credit rating of the banks, all else equal. Thus, the new requirements consist of elements that Moody looks at when setting the credit rating. If the rating is increased then funding costs will decrease³⁴⁴, which can be linked to the discussions in the borrowing rate section 7.3.2.2. Thus, based on this and the above analyses, it seems as higher capital requirements decrease risk, which will increase the credit rating and thereby decrease the

³⁴¹ Søndergaard (2005)

³⁴² Moody's I

³⁴³ Ibid.

³⁴⁴ Clausen & Filges (2012)

funding rate. Thus, it seems, as the capital requirements will increase the credit rating of banks. However, it is out of scope to analyse the effects of capital requirements on credit ratings, as it is a whole other thesis. This will therefore not be included in the scenario analysis but the authors are aware of this relationship. The relationship will be included indirectly, through risk, in the scenario analysis.

7.3.3 Sub Conclusion

Based on the M&M analysis, the level and first difference regressions showed that the effect of M&M's theory in real life for this sample, in the period from 2006 to 2012, is between -4.08% and 6.25% without taxes and -4% and 3.66% with taxes. Thus, the effect of M&M is close to zero, i.e. M&M does not have an effect. This means that a change in the capital structure, due to the new CRD-IV requirements will affect the value of the banks.

Furthermore, the simple model analysis showed how the Tier 1 capital requirements affected the banks' financial statements. It was found that the higher capital requirements directly affected the amount of retained capital, the cost of facilitating the loans and the equity amount. It was clear, that this was likely to force the banks' managements to increase the lending rate of each loan, as the bank wishes to pass on the higher needed income to lend on to the customers. Further, it was analysed that the capital requirements affected the banks' risk and thereby borrowing rate. The lending and borrowing rate are incorporated into the scenario analysis by decreasing the funding rate with 0.127% and by increasing the lending rate with 0.035% for a one percentage point increase in the Tier 1 ratio. Nonetheless, the authors are aware that many other factors, such as the required rate of return on equity, ROE, required earnings, loan portfolio, total assets and the credit rating are influenced by higher capital requirements as well, i.e. this is not an exhaustive list. However, in order to answer the research question and reach usable results the limitation of only altering the lending and borrowing rate, in the scenario analysis, is necessary. Therefore, one has to understand and comment on the conclusions of this thesis within the frames of which the results are reached.

7.4 Valuation

The valuation analysis is an essential part of the thesis, as all the above analyses leads to the valuation analysis. The valuation analysis is divided into three parts, firstly a relative valuation of the banks, then a discussion on how to improve the models, for the scenario analysis, and lastly the scenario analysis will take place. The scenario analysis will primarily be based on the capital requirements analysis and the relative valuation of the banks. The purpose of scenario analysis is to answer the overall research question and is therefore an essential part of the thesis. The scenario analysis will investigate how the banks' value changes when the Tier 1 ratio is hypothetical increased.

7.4.1 Relative valuation

In the following sections, the banks' relative values will be estimated using firstly the price-earnings ratio and secondly the market-to-book ratio. In each section, a forward-looking ratio will be calculated in order to incorporate investors' expectations regarding the future earnings potential of the banks.

7.4.1.1 Forward Price-Earnings ratio

The forward P/E ratio indicates how much investors are willing to pay based on the expected future earnings potential of the bank³⁴⁵. The forward P/E ratio is used to value the banks with, as the scenario analysis has a forward-looking view and because it is expected that banks' earnings will grow in the future³⁴⁶. Hence, the banks' estimated future earnings were included in the calculation to incorporate investors' future expectations in the valuation. Further, by including estimated earnings, it yields a more consistent ratio, since the share prices also include future expectations³⁴⁷. Hence, by using estimated earnings, instead of trailing earnings, the ratio becomes more consistent.

The ratio was calculated by using the following formula

$$Forward_{i,t} \frac{P}{E} = \frac{Share Price_{i,t}}{Estimated Earnings Per Share_{i,t+1}}$$

The share price and the estimated earnings per share (estimated EPS) were found on Bloomberg. The share price used for each bank was the last available price in 2012, i.e. year-end price. The estimated EPS used, for each bank, was the consensus earnings estimates for 2013. For example, Banco Santander's forward P/E ratio was calculated by using a share price of €2.93 and an estimated EPS of €0.075, which yields a forward P/E of $\frac{2.93}{0.075} = 39.07$.

Before commenting on the banks' forward P/E ratios, a discussion on what, is believed, to affect the ratio will firstly be conducted. The following arguments, factors and relations are simplifications, and

³⁴⁵ Berk & DeMarzo (2011)

³⁴⁶ Investopedia VII

³⁴⁷ Elton et al. (1981)

only the most relevant factors, for this analysis, will be discussed. From the equation above, it is clear that a higher stock price will increase the ratio and higher estimated earnings will decrease the ratio, all else equal. A bank's earnings are determined by a bank's profitability level, as a bank's profitability level indicates the bank's ability to generate earnings. Thus, higher profitability will, ceteris paribus, lead to higher earnings³⁴⁸. In the financial analysis in section 7.2, five value drivers were analysed as they influence the banks' profitability level, i.e. earnings level. It was found that the worsening economic conditions, the low interest rate environment, high loan loss impairments and decreasing ROE affected the banks' earnings negatively, which might influence the estimated earnings level negatively. On the other hand, few banks had low cost-to-income ratios and high NII levels, which influenced the banks' earnings positively, which might influence the estimated earnings level positively. Thus, these factors are expected to influence the investors' estimated future earnings level combined with the investors' overall perception of the future economic outlook³⁴⁹. Furthermore, there are many reasons for why the share price of a bank would increase or decrease, such as, supply and demand, good or bad news, a change in the expected growth rate of the bank, the economic outlook and earnings, to name a few³⁵⁰. Thus, it seems as if earnings influence the price and the estimated earnings, and that the economic conditions affect both price and estimated earnings, which might cause double effects on the ratio.

³⁴⁸ Investopedia VIII

³⁴⁹ Investopedia IX

³⁵⁰ Investopedia X & Ackert & Deaves (2010)

The calculated forward P/E ratios for the sample banks can be seen in the following figure.



Figure 15: Forward P/E Ratio

Source: Bloomberg, own calculations

As expected, there seems to be a trend among the forward ratios of the 25 banks. However, the trend is not as anticipated. Banks that are exposed to the South-European economies, such as the Italian and Spanish banks, tend to have substantially higher forward P/E ratios than, for example, banks exposed to the North-European economies. For example, the Nordic banks, such as Nordea, DnB, SEB and Swedbank, have among the lowest forward P/E ratios, which indicates that investors will pay less for these banks' future earnings, than for the Spanish banks' future earnings. Thus, investors might expect Banco Popular Espanol and UniCredit's earnings to increase by more in the future, as they will pay more for their earnings now³⁵¹. However, this trend seems to be counterintuitive when compared with the findings in the financial analysis. In the financial analysis, the Swedish banks tended to outperform their peers, by having lower cost-to-income ratios, higher NIIs, higher ROEs and operating in a more favourable economy. Therefore, one would have expected that these banks would have had the highest forward P/E ratios. Moreover, the South-European banks have been exposed to unfavourable economic conditions, which were found, in the financial analysis, to have affected their profitability negatively. It is therefore puzzling, that investors seem willing to pay more for the South-European banks' future earnings than for the Northern European banks' future earnings, than for the Northern European banks' future earnings.

³⁵¹ Berk & DeMarzo (2011)

based on the forward P/E ratio. However, as the South-European banks' earnings have been lower over the recent years, then investors might expect their earnings to increase relatively more than the Nordic banks' earnings, as these have a high earning level, thus, their earnings might not be able to increase with as much. Furthermore, another possible explanation could be related to how the forward P/E ratio was calculated, as small estimated EPS will lead to a higher forward P/E ratio. As many of the South-European banks had low estimated earnings then this could explain their high ratios. Further, most of the North-European banks had relatively high estimated earnings, which would make the ratio relatively smaller. Nonetheless, the above trend of the forward P/E ratios seems odd.

7.4.1.2 Forward Market-to-Book ratio

The forward M/B ratio indicates how much investors are willing to pay for the banks' future book value of equity³⁵². The forward M/B ratio is used for the same reasons, as for why the forward P/E ratio is used, see section 7.4.2.1. By incorporating the investors' expectations, the ratio becomes more consistent, as the market capitalisation, among other things, also includes investors' expectations.

The forward M/B ratio is calculated as follows $Forward_{i,t} \frac{M}{B} = \frac{Market \, Value \, of \, Equity_{i,t}}{Book \, Value \, of \, Equity_{i,t+1}}$

The forward book value of equity was calculated by firstly extracting the consensus earnings estimates for 2013 from Bloomberg, i.e. the same estimated earnings as was used in the forward P/E ratio. Then each banks' payout ratio for 2012 were extracted from Bankscope. The retained earnings were then calculated by multiplying the estimated earnings with one minus the payout ratio, i.e. if the estimated earnings were €100 and the payout ratio was 60 %, then the retained earnings would be €100 X (1 – 60%) = €40. The forward book value of equity could then be calculated by adding the retained earnings to the bank's book value of equity in 2012. The market value of equity was found on Bloomberg and was the banks' market capitalisation on the last trading day in 2012. For example, Svenska Handelsbanken's book value of equity was calculated by firstly extracting their estimated earnings from Bloomberg, which was €1,567.85 million. Then their payout ratio was extracted from which 48.67%, in 2012. Hence, their retained Bankscope, was earnings was €1,567.85 million X (1 – 48.67%) = €804.78 million. Svenska Handelsbanken's book value of equity in 2012 was €12,100.53 million in 2012. Thus, their forward book value of equity was €12,100.53 *million* + €804.78 *million* = €12,905.31 *million*.

³⁵² Berk & DeMarzo (2011)

Svenska Handelsbanken's market cap, on the last trading day in 2012 was €16,523.9 million. Thus, their forward M/B ratio was $\frac{16,523.9}{12,905.31} = 1.28$ in 2012.

Before commenting on the banks' forward M/B ratios, the factors affecting the ratio will firstly be discussed. One should be aware that the following arguments, relations and factors are simplifications, and only the most relevant factors, for this analysis, will be discussed. Based on the above equation, it is clear that a higher market cap will increase the ratio, and a higher forward book value of equity will decrease the ratio, all else equal. The market cap of a bank is calculated by multiplying the amount of outstanding shares with the stock price. If the amount of outstanding shares is assumed constant, then the factors affecting the stock price will also affect the market cap. The most relevant factors, in terms of this analysis, determining the stock price was discussed in the forward P/E section, see section 7.4.2.1. Based on the above discussion, earnings and the economic outlook were important factors affecting the stock price.

Furthermore, there are many factors affecting the forward book value of equity, among others, capital requirements, retained earnings and earnings³⁵³. The three mentioned factors are only few that influence the banks' book value of equity and it is thus not an exhaustive list. An 'all else equal' approach is used, in order to be able to comment and analyse on how these factors affect the book value of equity. As a simplified example, higher capital requirements affect the book value of equity positively, because, as was analysed in section 7.3.2.1, higher capital levels increases the amount of equity. Further, higher book values of equity, due to higher capital requirements, leads to a lower M/B ratio, ceteris paribus. If the bank does not hold enough required equity, in terms of the capital requirements, then the bank has to grow its equity base by issuing new shares or by retaining more of its earnings³⁵⁴, all else equal. Thus, the capital requirements will also affect retained earnings, as the banks, which do not have the necessary capital are unable to pay dividends until the required capital level is reached, which will positively influence the level of retained earnings³⁵⁵. The higher the retained earnings, the higher the book value of equity and the lower the ratio, ceteris paribus. In addition, as was analysed in the above forward P/E section, see section 7.4.2.1, profitability greatly affects earnings. If earnings increase, then retained earnings may increase, however, a bank may choose to pay higher dividends instead of retaining earnings, if earnings increase. One should be

³⁵³ Berk & DeMarzo (2011) & Raaballe (2013)

³⁵⁴ Berk & DeMarzo (2011)

³⁵⁵ Accenture I

aware that earnings and retained earnings do not necessarily increase or decrease with the same speed, but the size of the retained earnings is dependent on the size of earnings. Unless started otherwise, whenever earnings are said to increase then it refers to retained earnings as well, in the following analysis. Based on the above forward P/E analysis, the low interest rate environment, the worsening economic conditions, the high loan loss impairments and decreasing ROEs were found to have a negative impact on the banks' earnings. When earnings are affected negatively then it might affect the estimated earnings, and thereby the retained earnings. However, based on the forward M/B equation, unless earnings are negative, the book value of equity will still increase with earnings, due to retained earnings, which will decrease the ratio, ceteris paribus³⁵⁶. Thus, it seems as if earnings and the economic conditions affect both the market cap and the book value of equity. Still, one should keep in mind that the above analysis is simplified and unrealistic, as many other factors affect the price and book value of equity.

In the following figure the banks' forward M/B ratios are shown.



Figure 16: Forward M/B Ratio

Source: Bloomberg, Bankscope, own calculations

If the forward M/B ratio is above one, then investors are willing to pay more for the book value of equity than what it is carried at in the books³⁵⁷. Investors will pay more for the book value, if they

³⁵⁶ Accounting Coach I

³⁵⁷ Berk & DeMarzo (2011)

believe that the future value of the bank will increase, that the book value is undervalued or that the bank is able to generate a fair return on its capital³⁵⁸. It is surprising, based on the financial analysis, that Banco Popolare - Società Cooperativa has such a high ratio, as the bank was exposed to the Italian economy that was severely hit by the Financial Crisis, which have affected their profitability negatively, as described in section 7.2. Moreover, it was found that the Italian banks, including Banco Popolare – Società Cooperativa, had rising cost-to-income ratios through the years 2006 to 2012. This indicates that their ability to generate earnings in relation to costs had deteriorated. Lower earnings would indicate that the bank's management had failed to add substantial value to the bank, which traditionally would lead to a lower M/B ratio³⁵⁹. Further, Banco Popolare – Società Cooperativa had negative earnings estimates, which reduces the bank's equity. However, given the same market cap, a reduction in the bank's equity would lead to a higher ratio, which could explain their abnormal high ratio, on a mathematical level. Furthermore, the Swedish banks tended to outperform their peers, in the financial analysis, by having lower cost-to-income ratios, higher NIIs, higher ROEs and operating in a more favourable economy. Therefore, one would have expected that these banks would have had a higher or at least a forward M/B ratio of one, which is not the case in the above graph. Thus, it is surprising that investors seem willing to pay more for Banco Popolare – Società Cooperativa's book value of equity than for the Swedish banks' book value. Nonetheless, as the South-European banks' earnings and market cap have been lower over the recent years, then investors might expect their earnings and market cap to increase relatively more in the future, than the Nordic banks' earnings and market cap, as their earnings and market cap might not be able to increase with as much given their already high level.

If the forward M/B ratio is below one, then investors will pay less than the book value of equity³⁶⁰. The investors will pay less for the book value, if they believe the book value is overvalued, that the value of the bank will decrease in the future or that the bank does not provide a satisfactory return on its capital³⁶¹. Based on the above graph most banks' ratios are less than one, which is not unrealistic, as the M/B ratio for banks is often around one³⁶². Nonetheless, the average ratio, without Banco Popolare – Società Cooperativa, is 0.67, which does seem puzzlingly low. An explanation to the average low ratio could be that the new and higher capital requirements forces banks to hold more

358 MIT I 359 Berk & DeMarzo (2011) 360 Ibid. 361 MIT I 362 Investing Answers I equity. More equity will, ceteris paribus, lead to a lower ratio on a mathematical level. Further, a higher equity base, given the same earnings, will lead to a lower ROE. Thus, the ratio might be low because investors expect the ROE to decrease, i.e. expect the banks to be unable to provide a fair return on its capital. Hence, the low ratio may indicate that investors believe that banks will not generate as high a ROE in the future, because of the higher equity base. Thus, higher capital requirements may influence the banks' ratios in two ways: through lower ROEs, given the same earnings, and through higher equity base. The combination of the two could explain the low average ratio. On the other hand, as was analysed in section 7.3.2.1, the higher the equity base of banks the more loans they are able to facilitate and the more they are able to earn. Thus, investors apparently believe, based on the above figure, that banks will not be able to increase earnings, which seems puzzling.

Based on the financial analysis, one would have expected the largest banks in the sample, based on market cap, to have had ratios close to one. This is because the largest banks in the sample are all G-SIFI banks, i.e. systemically important, and therefore under great surveillance and regulation of how to estimate their book value of equity. One can therefore assume that the book value of equity is valued correctly. Hence, it would seem odd if the low ratio was due to investors assuming that the large banks' book value of equity was overstated. A more likely explanation could be the same as described above, i.e. that the higher equity base, due to increasing capital requirements, will lead to lower ROEs, given the same earnings, which perhaps reduces the attractiveness of the banks. However, again this seems to contradict what was analysed in the capital requirement analysis in section 7.3.

The findings from the above figure does not seem substantially unrealistic, however, the results are not exactly as originally anticipated. The fact that Banco Popolare – Società Cooperativa's ratio was the highest, that the Swedish banks did not have ratios above one and that the largest banks, measured by market cap, did not have ratios closer to one seems odd.

7.4.2 Improving the Valuation Models

Based on the above relative valuations of the banks, the forward ratios seems inconsistent with what one would have expected from the strategic framework, financial analysis and capital requirement analysis. Thus, in the figure below all the banks' values are calculated and shown. The first column shows the market cap, on the 31st of December 2012, for each bank, which was found on Bankscope. This value is expected to be the true value of the banks on that day. In the next column, the values of the banks are shown, based on the forward P/E model. This value was calculated by multiplying the forward P/E ratio with each banks' reported earnings in 2012. In the next column, the differences between the market cap and the values, based on the P/E model, are calculated. One should interpret the values in this column, as how much more or less the P/E model estimates the banks' values to be, in relation to the market cap. It clearly shows that most banks' values, from the P/E approach, differ substantial from their market cap. The column indicates that, for example, the value of Banco Santander, based on the P/E model, is 32% less than its market cap. Société Générale's value with the P/E model is 151.9% higher than its market cap. There are some banks that have a value of zero based on the P/E model. This is because the banks' reported earnings in 2012 were negative.

In the next column, the values of the banks are shown based on the M/B model. The banks' values were calculated by multiplying the forward M/B ratio with each bank's reported book value of equity in 2012. In the following column, the differences between the values based on the M/B model and the market cap are shown. One should interpret the values as how much more or less the M/B model estimates the banks' values to be, in relation to the market cap. It is clear that the values based on the M/B model are significantly different from the market cap. From the column, it is clear, that Banco Santander's value with the M/B approach is 6% higher than its market cap. Danske Bank's value is only 0.44% lower with the M/B approach than its market cap, which is close. However, Banco Popolare – Società Cooperativa's value based on the M/B ratio is 657% higher than its market cap, which is quit a substantial difference. Thus, it makes sense that one was surprised by Banco Popolare – Società Cooperativa's high forward M/B ratio, in the above forward M/B section 7.4.1.2, compared to the difference between the M/B value and the market cap value. Even though one could not pinpoint what was incorrect with the forward M/B ratios, this column clearly shows that the ratios were unrealistic and therefore do not make any sense.

On average, the P/E model underestimated the banks' values, in relation to their market cap, with 21%, and on average the M/B model overestimated the banks' values, in relation to their market cap, with 24.4%. Thus, it is clear from the figure below that there are significant differences between the calculated values and the banks' actual values, which indicate that the models cannot be used in their original form and the doubt, from the above relative valuation analysis, was justified.

| Bank | Market Capitalisation, 2012 | P/E | (P/E/Market Cap)-1 | M/B | (M/B /Market Cap)-1 |
|--|-----------------------------|-----------|--------------------|-----------|---------------------|
| Banco Santander SA | 64,494.81 | 43,714.22 | -32.2% | 68,485.14 | 6.19% |
| BNP Paribas | 52,881.10 | 69,514.31 | 31.5% | 52,239.04 | -1.21% |
| UBS AG | 45,247.57 | 0.00 | -100.0% | 45,692.79 | 0.98% |
| Lloyds | 40,310.63 | 0.00 | -100.0% | 33,694.30 | -16.41% |
| Barclays | 38,420.84 | 1,995.19 | -94.8% | 29,677.03 | -22.76% |
| Banco Bilbao Vizcaya Argentaria SA | 37,350.88 | 35,991.02 | -3.6% | 38,953.79 | 4.29% |
| Deutsche Bank AG | 30,340.09 | 2,597.79 | -91.4% | 33,592.51 | 10.72% |
| Nordea Bank AB (publ) | 29,304.85 | 27,970.19 | -4.6% | 27,777.67 | -5.21% |
| ING Groep NV | 27,045.60 | 23,795.34 | -12.0% | 27,114.44 | 0.25% |
| Credit Suisse | 24,309.70 | 12,999.37 | -46.5% | 22,185.86 | -8.74% |
| Royal Bank of Scotland Group Plc (The) | 23,560.60 | 0.00 | -100.0% | 20,130.43 | -14.56% |
| Crédit Agricole S.A. | 23,277.30 | 0.00 | -100.0% | 15,219.67 | -34.62% |
| Société Générale | 22,112.89 | 55,693.49 | 151.9% | 22,522.92 | 1.85% |
| UniCredit SpA | 21,456.02 | 53,941.60 | 151.4% | 21,398.44 | -0.27% |
| Intesa Sanpaolo | 20,151.67 | 43,881.63 | 117.8% | 20,160.93 | 0.05% |
| Svenska Handelsbanken | 16,817.65 | 17,211.94 | 2.3% | 15,543.64 | -7.58% |
| DnB ASA | 15,602.60 | 12,409.59 | -20.5% | 13,737.86 | -11.95% |
| Swedbank AB | 14,075.07 | 16,032.69 | 13.9% | 14,221.63 | 1.04% |
| Skandinaviska Enskilda Banken AB | 13,969.92 | 12,068.31 | -13.6% | 12,686.65 | -9.19% |
| Danske Bank A/S | 12,920.43 | 7,205.63 | -44.2% | 12,863.27 | -0.44% |
| KBC Groep NV | 10,297.30 | 6,000.04 | -41.7% | 10,914.08 | 5.99% |
| Erste Group Bank AG | 9,479.51 | 15,052.06 | 58.8% | 10,202.38 | 7.63% |
| Banco Popular Espanol SA | 4,927.38 | 0.00 | -100.0% | 5,568.55 | 13.01% |
| Mediobanca SpA | 2,991.56 | 1,601.82 | -46.5% | 4,014.58 | 34.20% |
| Banco Popolare - Società Cooperativa | 2,218.77 | 0.00 | -100.0% | 16,799.36 | 657.15% |
| Average | | | -21.0% | 6 | 24.42% |

Figure 17: Valuation Based on Forward P/E and M/B

Source: Bankscope, Bloomberg, own calculations

Both valuation models have traditionally been used to value banks³⁶³. However, the time period from 2006 to 2012 have been an abnormal period, where both the banks' and the market's behaviour have been unpredictable and have been driven by abnormal factors³⁶⁴. Thus, due to the unusual time period the models seem to have failed at valuing the banks correctly. The weaknesses of each model will now be discussed separately.

7.4.2.1 Price-Earnings Ratio

There is a problem with using the forward P/E model when banks' earnings and stock prices have been volatile and/or negative. From the financial analysis in section 7.2, it is clear that the financial value drivers have been volatile in the years 2006 to 2012. This volatility can be expected to have influenced the banks' valuation, as it is difficult to make sound future estimates when the history is abnormal and volatile³⁶⁵. Based on appendix 20, it is clear that the banks' earnings have been volatile, and some negative, during the time period. If one looks at the following figure of the banking index,

³⁶³ Massari et al. (2014)

³⁶⁴ Senbet & Gande I

³⁶⁵ Gujarati & Porter (2009)

it indicates how volatile the stock prices have been too over the years, which can lead to incorrect valuations when using the P/E ratios, as volatile earnings and prices can result in volatile P/E ratios.



Figure 18: Development of Stoxx 600 European Banks

Source: Stoxx II, own calculations.

From the above figure it is clear, that the overall stock prices have decreased with 60% from 2006 to 2012. The average earnings, for all the banks, have decreased with 80% from 2006 to 2012, see appendix 20. The fact that earnings have been more volatile than stock prices indicates how difficult it has been to value banks based on earnings. Thus, the market might have been forced to value banks based on other factors less volatile. As both earnings and stock prices have been volatile it violates the conditions of which the P/E model is build³⁶⁶. This explains why the forward P/E ratios were different than expected and why the banks' values, based on the forward P/E model, were 21% lower than their market caps.

The fact that the stock prices have been this volatile suggests that abnormal factors have driven the value of the banks. These factors include, among others, the banks' ability to cut costs, banks' ability to reach the required capital level, how much excess capital the banks have, expected dividend and loan loss levels³⁶⁷. Many of the banks, in the sample, have been affected by significant loan losses, as was seen in the financial analysis, where loan loss impairments were high. High loan losses lead to lower values, or even overall losses for the bank, all else equal, which reduces the equity. Further,

³⁶⁶ Beaver & Morse (1978)

³⁶⁷ Nordnetbloggen I

the new capital requirements might have affected how the market has valued banks, as the investors have known since 2010 that the new capital requirements would be implemented. Thus, banks with more Core Tier 1 capital might have been valued higher, as they might have been perceived as safer, because they were not forced, to the same degree, to issue new equity, Tier 1 or Tier 2 capital, which is expensive³⁶⁸. Further, as the banks' risk decreased, the banks' values might increase, as the investors then requires a lower return³⁶⁹. Lastly, as earnings have been volatile, and in some cases negative, then there has not been any earnings growth. Hence, the only way for banks to improve their bottom line, when earnings were not growing, is through cutting costs. Thus, investors might have looked at the banks' ability to cut and control costs when valuing them, which should make the banks with the lowest cost-to-income ratio, as analysed in the financial analysis, most valuable.

Some argue that the market is also driven by mean reversion, which indicates, that the market will return to the same P/E level as before the Financial Crisis, because the market has been overreacting³⁷⁰. One would then expect that banks, whose P/E ratios fell to an unjustified low level, would increase in value simply because the market valuation decreased too much. One could therefore argue, that instead of using the biased forward P/E ratios, which does not reflect the true valuation of the banks, because of the abnormal earnings and price trends, one could use the twenty-year historical average P/E ratio, for each bank, to value them with instead. By using the average historical P/E ratio, one mitigates the significant volatility, noise and autocorrelation problem that exists in the forward P/E ratio, between historical earnings and price trends, due to the abnormal time period.

Thus, the average twenty-year P/E ratios will be used as the basis for the valuation of the banks in the scenario analysis.

7.4.2.2 Market-To-Book Ratio

Many of the above reasons as for why the forward P/E ratio could not be used, are the same reasons as for why the forward M/B ratio cannot be used either. The forward M/B ratio is also highly affected by the volatility of the share prices, as it makes the market cap volatile too. However, the book value of equity has not been as volatile throughout the time period, thus, the M/B ratio has been more stable

³⁶⁸ Financial News I

³⁶⁹ Nationalbanken (2013)

³⁷⁰ Ackert and Deaves (2010)

throughout the time period, see appendix 21. The book value of equity makes the ratio more stable, as it has not been as affected by market movements, see appendix 22. Nonetheless, the above table shows that the M/B model overestimates the banks' values with, on average, 24.4%. Thus, there are problems with using the forward M/B ratio too, which will be analysed next.

The M/B ratio can be explained by ROE, as the ratio can be written as

 $\frac{M}{B} = \frac{ROE - g}{r_E - g}$ 371, where g is the growth rate and r_E is the cost of equity.

The forward M/B ratio was not calculated by using this formula, however, the formula still explains what affects the M/B ratio. Thus, the higher the ROE, all else equal, the higher the ratio and thereby the higher the value of the bank³⁷². However, as analysed in the financial analysis, ROE was low in 2011 and 2012 and volatile throughout the time period. The fact that ROE has been low and volatile can be explained by earnings being low and volatile, as earnings, to a great extent, determine ROE, all else equal. A lower ROE will lead to a lower value of the bank. However, the volatility issue is a problem, as volatile prices, earnings and ROE violates the assumptions of which the M/B model is build³⁷³. Further, negative earnings can lead to ROE being zero or negative. This would, ceteris paribus, lead to a negative ratio, which would not make any sense. Thus, a volatile ROE makes the ratio volatile, and thus not as stable as firstly assumed. This could explain why the forward M/B ratios have failed to value the banks correctly.

As ROE, earnings and prices were volatile investors might have been forced to value banks on abnormal factors, such as excess capital, loan losses and mean reversions. Firstly, the investors knew in 2010 that the new capital requirements had to be implemented by 2019, as the information concerning CRD-IV was publically available. Thus, investors might have valued banks on whether the bank had excess capital or not. If the banks had more Core Tier 1 capital than required, then investors may have thought they would receive dividends, which would make the banks more valuable³⁷⁴. If banks had too little capital, then investors knew they would have to issue expensive Tier 1 or Tier 2 capital or issue new shares³⁷⁵. Furthermore, as analysed in the financial analysis in section 7.2.3, loan loss impairments have been relatively high during the time period. If loan losses are significant, then it can result in an absolute loss for the bank, which will decrease its equity and

³⁷¹ MIT I

³⁷² Damodaran IV

³⁷³ GC Capital Ideas I

³⁷⁴ Damodaran I

³⁷⁵ Financial News I

thereby value, as the bank then is worth less. Thus, the high level of loan losses might have influenced how investors have valued banks in this time period, where loan loss levels were significant.

In appendix 21, the M/B ratios for all the banks over the years 2006 to 2012 can be seen. In 2006, all the banks ratios were clustered together with an average ratio of 1.85. Whereas the average M/B ratio in 2012 was only 0.68 and there was a much greater variation in the values of the ratios. Thus, based on the above argument of momentum and mean reversion, the M/B ratios should again increase and be clustered together around one. Thus, investors might buy bank stocks with a low M/B ratio, as the too low M/B ratio might no longer be justified. This would increase the stock price of the banks, i.e. the market cap, thereby the M/B ratio, which would increase the value of the bank, all else equal. This might happen until the M/B ratios are closer to one. Thus, investors might value banks and buy stocks solely based on a mean reversion mindset. This explains why the forward M/B ratios were as low as they were in the relative valuation analysis, section 7.4.1.2.

Based on the above analysis, one could infer that the market might have based their valuation on abnormal factors, because the market could not rely on normal factors, such as earnings and ROE. This could explain why the calculated forward M/B ratios do not correctly value the banks.

From the above analysis, it is clear that ROE, earnings and stock prices have been volatile, which might violate the assumptions of which the M/B model is build³⁷⁶. Thus, instead of using the forward M/B ratios, which do not reflect the true value of the banks, because of the abnormal ROE, earnings and price movements and fluctuations, one could therefore use the average historical twenty-year M/B ratio, for each bank, to value the banks with. By using the average historical M/B ratio one limits the noise, autocorrelation and volatility impact that occurs in the forward M/B ratio. Thus, the average historical twenty-year M/B ratio will therefore be used as the basis for the scenario analysis in the following section.

7.4.2.3 Sub Conclusion

Due to volatility in earnings, stock prices and ROE and the fact that the market has valued banks based on abnormal factors, then the models cannot be used in their original form, due to the unusual time period. There was too much autocorrelation in the historical data, which would skew the starting point and consequently the results of the scenario analysis, if the model were used in their original

³⁷⁶ CG Capital Ideas I

form. This would cause significant problems in the scenario analysis, as it would affect the causality in the scenario analysis, which is essential to keep track of. The causality issue is especially important in the scenario analysis, as one is interested in keeping all relations constant and only changing few specific factors in order to investigate the effect of a higher Tier 1 ratio on the banks' valuation. Thus, the average historical twenty-year P/E and M/B ratios will be used as the starting point for the scenario analysis.

7.4.3 Scenario analysis

Based on the above sections, the basis for the scenario analysis has now been formed. The expectations regarding the scenario analysis, is that it will show to what extent higher capital requirements will affect the relative value of the sample banks, using the average historical twenty-year P/E and M/B ratios for each bank. As mentioned in section 7.3, capital requirements affect banks in many ways, some of which are complex and counteracting. In order to achieve usable results, within the page frame of this thesis, many of these relations are assumed to be constant. The scenario analysis will therefore be a *ceteris paribus* and a steady state analysis, where only the lending rate and borrowing rate are changed given a hypothetical increase in the Tier 1 ratio.

Even though these valuation models are relative objective a number of assumptions have to be made in this analysis, which will limit the ability to generalise the results. The historical P/E and M/B ratios are kept constant when changing the Tier 1 ratio. Thus, it is assumed that investors would pay the same for the banks' future earnings and book value of equity no matter the Tier 1 ratio. This is a limiting assumption, as it is rather unrealistic to assume that the ratios would not change when the Tier 1 ratio changes. Holding this ratio constant is therefore a limitation to this thesis, however, it is done in order to obtain usable results and it is a method that is widely used in practice³⁷⁷. Moreover, it is important to keep in mind that the goal of this thesis is not to investigate and find the true value of the banks, but rather to analyse what happens to the banks' values when the Tier 1 ratio is changed. Further, the assumption is necessary to make, as one does not know how the P/E and M/B ratio changes with the Tier 1 ratio, before the Tier 1 ratio is actual increased in real life. Thus, the authors know that the assumption is strict and unrealistic, yet necessary to achieve usable results.

³⁷⁷ Suozzo et al. (2001)

The scenario analysis is conducted by increasing the lending rate and decreasing the borrowing rate. Thus, it is assumed that the lending rate and borrowing rate is the same for all the banks in the sample. Further, it is assumed that the lending rate and borrowing rate will increase linearly, i.e. the change is the same no matter if the Tier 1 ratio increases from 12% to 13% or from 39% to 40%. This is an unrealistic simplification, however, necessary to make in order to reach usable results. The lending rate is assumed to increase with 3.5 basis points, when the Tier 1 ratio increases with one percentagepoint, based on Kashyap et al.'s (2010) findings. The borrowing rate is assumed to decrease with 0.127%, when the Tier 1 ratio increases with one percentage point, based on the regression with Tier 1 ratio on funding, in the capital requirement analysis 7.3. Other income, net gains on trading and derivatives, net gains on assets, net fees and commission, overheads, loan loss provision, risk weights, loan portfolio, quality of the assets, composition of assets and required rate of return on equity are all assumed constant, when changing the Tier 1 ratio. Total assets, i.e. the balance, are assumed to be constant when using the historical P/E ratio. However, the equity base will not be held constant when using the M/B ratio. The authors know that these assumptions are strict and unrealistic. One should be aware that these assumptions limit the ability to generalise the reached conclusions, but the results are considered to be valid and usable, if understood within the frame of this thesis.

Furthermore, the banks' Tier 1 ratios cover a wide range from a Tier 1 ratio of 9.9% to 21.3%. Thus, in order to create a common starting point, all banks' Tier 1 ratios are discounted back or forward so the starting point is a Tier 1 ratio of 12%. A Tier 1 ratio of 12% was chosen, as the starting point, as most banks had a Tier 1 ratio of 12%. For the banks with a Tier 1 ratio lower than 12% the lending rate will increase with 3.5 basis points and the borrowing rate will decrease with 0.127% per one percentage point increase in the Tier 1 ratio until the Tier 1 ratio is 12%. For banks with a Tier 1 ratio higher than 12% the lending rate will increase with 3.5 basis points and the borrowing rate in the Tier 1 ratio is 12%. For banks with a Tier 1 ratio higher than 12% the lending rate will increase with 3.5 basis point decrease in the Tier 1 ratio until the Tier 1 ratio until the Tier 1 ratio is 12%. For banks with a Tier 1 ratio is 12%. Thus, a common starting point has now been created. The authors are aware that many more entries on a bank's financial statements will change when the Tier 1 ratio is decreased, for example, from, 21.3% to 12%. Thus, the assumption is unrealistic and strict. However, this assumption is necessary to make in order to create a common starting point for the scenario analysis.

Lastly, when it is stated, in this thesis, that the Tier 1 ratio increases, then this is assumed to be equivalent to an increase in the Core Tier 1 ratio, i.e. equity. This is because the Additional Tier 1

capital, capital buffers, asset composition and asset quality are assumed constant. Thus, a one percentage point increase in the Tier 1 ratio is equivalent to a one percentage point increase in equity, and thereby value of the banks. This is of course a simplification, however, one that is needed in order to comment on the relative increases in the values of the banks, when the Tier 1 ratio is increased. Nonetheless, the assumption is unrealistic, strict and limits the ability to generalise the reached conclusions, however, the reached conclusions are considered to be valid and usable, if understood within the frame of this thesis.

All the above assumptions are necessary in order to begin the scenario analysis using the historical P/E and M/B ratios.

7.4.3.1 Price-Earnings Ratio

The following figure shows, the average increase in the banks' value, when the Tier 1 ratio is increased from 12% to 40%, using the average historical twenty-year P/E ratio for each bank. The increases in the banks' value were indexed, in order to comment on the percentage increase, when the Tier 1 ratio increases. The values of each bank are indexed at 100 when the Tier 1 ratio is 12%.

| Figure 19: Indexed valuation Using P/E | | | | | | | | | | | | | | |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Tier 1 Ratio % | 13% | 14% | 15% | 16% | 17% | 18% | 19% | 20% | 21% | 22% | 23% | 24% | 25% | 26% |
| P/E | 100.72 | 101.45 | 102.17 | 102.89 | 103.61 | 104.34 | 105.06 | 105.78 | 106.51 | 107.23 | 107.95 | 108.67 | 109.40 | 110.12 |
| | | | | | | | | | | | | | | |
| Tier 1 Ratio % | 27% | 28% | 29% | 30% | 31% | 32% | 33% | 34% | 35% | 36% | 37% | 38% | 39% | 40% |
| P/E | 110.84 | 111.57 | 112.29 | 113.01 | 113.73 | 114.46 | 115.18 | 115.90 | 116.63 | 117.35 | 118.07 | 118.79 | 119.52 | 120.24 |

Figure 19: Indexed Valuation Using P/E

The increases in the banks' value, at higher Tier 1 ratios, can be seen in appendix 23. Six banks had negative earnings in 2012, thus their values were negative, and they will therefore not be included. These are UBS, Lloyds, Royal Bank of Scotland, Crédit Agricole, Banco Popular Espanol and Banco Popolare - Società Cooperativa.

The banks' values were calculated by, firstly, extracting the banks' historical P/E ratios from Bloomberg, from 1994 to 2013, i.e. a twenty-year period, and secondly, calculating the average P/E ratio for each bank. The average P/E ratio is now cyclically adjusted, as the recent volatility in the ratios has been mitigated. The specific P/E ratio for each bank is assumed constant, when the Tier 1 ratio is increased. Hence, it is expected that the value of the banks, based on their historical P/E ratio,

Source: Bankscope, own calculations

will revert to their historical mean. Thirdly, the effect on earnings, when the Tier 1 ratio is increased, is now calculated. The lending rate increases with 0.035%, which is multiplied with the banks' lending amount, per one percentage point increase in the Tier 1 ratio. The borrowing rate decreases with 0.127%, thus (1-0.00127) is multiplied with the banks' borrowing amount, per one percentage point increase in the Tier 1 ratio. As all other inputs in the banks' income statements are assumed constant, then one can see the rippling effect of a higher Tier 1 ratio on the bank's earnings. The new calculated earnings are now multiplied with the bank's historical P/E ratio, which will lead to the new price. The calculated price is an indication of the bank's value at the higher Tier 1 ratio. A part of the dynamic Excel model is illustrated in appendix 24, however, only for Swedbank and Banco Santander.

As an example, the value of Swedbank, when the Tier 1 ratio increases from 12% to 13%, will now be conducted using the above method. The historical P/E ratio of Swedbank was estimated to be 19.72 based on the data from Bloomberg. Swedbank's earnings, with a Tier 1 ratio of 12%, were $\in 1,789.79$ million, which was read of their annual report. The price of Swedbank was, therefore, $\frac{P}{E} \times Earnings \rightarrow 19.72 \times 1789.79 = \epsilon 35,294.66$ million. The lending rate is now increased with 0.035% and the borrowing rate is decreased with 0.127%, following a one-percentage point increase in the Tier 1 ratio. The rippling effect of the changes in the rates are seen in the dynamic model, as Swedbank's earnings have increased to $\epsilon 1,795.79$ million. The new price, i.e. value, of Swedbank can now be calculated by multiplying the historical P/E ratio with the new earnings, i.e. $\frac{P}{E} \times New Earnings \rightarrow 19.72 \times 1795.79 = \epsilon 35,412.98$ million. Hence, the value of Swedbank increases from $\epsilon 35,294.66$ million to $\epsilon 35,412.98$ million, see appendix 23.

Based on figure 19, it is clear that the average value of the banks increases when the Tier 1 ratio is increased, however, the percentage increase in the banks' average value is less than the percentage increase in the Tier 1 ratio. For instance, when the Tier 1 ratio increases from 12% to 13%, i.e. an increase of 8.3%, then the average value of the banks increases with 0.72%. If the Tier 1 ratio increases from 12% to 24%, i.e. a 100% increase, then the average value of the banks increases with 8.7%. Lastly, if the Tier 1 ratio increases from 12% to 36%, i.e. a 200% increase, then the average value of the banks increases, then the average value of the banks increases and increases with 17.35%. Thus, the effect of a higher Tier 1 ratio has an increasing effect on the banks' values.
The trend is as expected, as the previous analyses have indicated that the banks' values would increase with higher Tier 1 ratios, as the lending rate increases and borrowing rate decreases. The result indicates that a higher Tier 1 ratio leads to a higher value. This could be due to the increased safety associated with higher capital bases³⁷⁸. A higher capital base decreases the banks' risk, as the probability of bankruptcy decreases, thus the credit rating might increase. This has a positive effect on the banks' values, as the funding rates and required rate of return on equity are expected to decrease as well, as analysed in section 7.3.2. Another possible explanation, for the increasing value trend, is that the higher Tier 1 ratios, ceteris paribus, might lead to higher earnings potential for the banks. This is because, higher capital bases increases the banks' ability to facilitate loans, as long as the Tier 1 ratios are above the required minimum level. This could lead to higher earnings for the banks, all else equal, see section 7.3.2.1. Higher earnings will, all else equal, lead to higher values of the banks. Hence, the increase in the banks' earnings potential might explain the average increase in the banks' values, following a higher Tier 1 ratio.

From appendix 23 it is evident, that the banks with larger market caps increases less in value than banks with smaller market caps. This indicates that banks with already high valuations do not seem to benefit as much from an increase in the Tier 1 ratio. The average increase for large and small banks can be seen in appendix 25. For instance, when the Tier 1 ratio increases from 12% to 24%, then the average value of the large banks increases with 4.5%. On the other hand, the average value of the small banks increases with 12.4%. This implies that the average value of the small banks increases considerably more than the large banks' average values, given an increase in the Tier 1 ratio. This trend can be explained by all the large banks, in this sample, are G-SIFI banks, thus, they are systemically important on a global scale³⁷⁹. Investors might, therefore, believe that the banks will not be allowed to go bankrupt, and are, therefore, not as concerned with their capital levels, as the banks will be supplied with more capital if they need it. Thus, the investors might not value an increase in the large banks' equity, as highly, as they would for a small bank, because the large banks are already perceived safe. Furthermore, due to the challenging economic conditions, investors might have questioned whether the small banks would survive at all, as they have had low earnings and high loan loss impairments, see appendix 20 and 10, respectively.

³⁷⁸ Financial Times III

³⁷⁹ International Association of Insurance Supervisors (2013)

It seems as if investors would reward the smaller banks with higher valuations, when their equity levels are increased, as they are then perceived as safer. As the large banks are already perceived as being safe, then the investors will not reward them with as high valuations. This could also indicate that once a bank has reached the invisible threshold of being perceived as safe, then other factors, such as earnings potential, size of credit losses, cost-to-income ratios and business models are focused on when valuing the bank, rather than its capital base³⁸⁰. However, the capital base might be a significant element in valuing more uncertain banks, which has not reached the invisible threshold yet³⁸¹. As an example, the survival of both KBC and Danske Bank was questioned during the Financial Crisis³⁸². Their values increased the most when the Tier 1 ratio was increased. This indicates that investors will reward uncertain banks when they become safer, due to higher capital levels. However, another explanation could be that these banks were not valued based on normal factors, such as earnings, during the Financial Crisis, but on surviving the Crisis³⁸³. Thus, as these banks become safer, the market will then start by valuing them based on, for example, earnings.

This scenario analysis is simplified and many factors are held constant, thus, the model does not take into account that at some point, investors might not reward the banks for increasing their capital levels anymore, which one should keep in mind. Nevertheless, it makes sense that the small banks' average values would increase by more than the larger banks' average values, as they need the capital more and are not perceived as safe³⁸⁴. However, one would also believe that the trend would diminish at some point when the Tier 1 ratio is increased.

From the above figure 19, it is clear that the average values do not increase with as much as the increase in the provided capital. For example, when the Tier 1 ratio increases from 12% to 13% it is an 8.3% increase in the capital, however, the average values of the banks only increases with 0.72%, i.e. an increase of less than the provided capital. This could be explained by the fact, that investors do not only look at the Tier 1 ratios when valuing banks, but also on, for example, earnings potential, loan losses, cost-to-income ratios, business models, strategies and the business cycle, to name a few³⁸⁵.

On one hand, one could argue that the society would be better off by placing the capital somewhere else, where the increase in value would be higher than the capital provided. The capital would then

³⁸⁰ Bloomberg IV

³⁸¹ Ibid.

³⁸² Berlingske III & Gazet Van Antwerpen I

³⁸³ Nordnetbloggen I 384 Caballero & Krishnamrthy (2008)

³⁸⁵ Investopedia X

generate more value than the capital is worth, which would add value to the society. Thus, one might believe that the capital could have been used more efficiently elsewhere in the society, as it seems the higher Tier 1 ratios tie up capital without providing a fair return. Thus, the capital could have been used more optimally somewhere else, as the increase in the banks' value is not more, or at least equal to, the increase in the Tier 1 ratio. On the other hand, one cannot state that the capital is not optimally placed even though the banks' values do not increase with as much as the provided capital. The capital might not provide a fair return, but one could see it as an insurance premium against future financial crises. Thus, it might be more valuable for the society not to have future crises and financial instability, which on average costs 10% of GDP³⁸⁶, than to receive the highest possible return on the capital. Hence, the society might not want the most optimal placement of this capital, because the few extra percentage points in return is much less than what it would costs to experience a new crisis. Based on the CRD IV requirements, it is clear that politicians believe that the capital is more valuable to the society when being placed in banks, because it reduces the risk of financial instability and crises, which are costly to the society. Thus, even though the extra capital, in the banks, might not generate added value it might be overall more valuable to the society, because it creates a safer financial industry.

7.4.3.2 Market-to-Book Ratio

The following figure shows, the average increase in the banks' value when the Tier 1 ratio is increased from 12% to 40%, using the average historical twenty-year M/B ratio for each bank. The increases in the banks' values were indexed, in order to comment on the percentage increase, when the Tier 1 ratio increases. The banks' values were index at 100, when the Tier 1 ratio was 12%.

| Tier 1 Ratio % | 13% | 14% | 15% | 16% | 17% | 18% | 19% | 20% | 21% | 22% | 23% | 24% | 25% | 26% |
|----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| M/B | 100.03 | 100.06 | 100.08 | 100.11 | 100.14 | 100.17 | 100.20 | 100.23 | 100.25 | 100.28 | 100.31 | 100.34 | 100.37 | 100.37 |
| | | | | | | | | | | | | | | |
| Tier 1 Ratio % | 27% | 28% | 29% | 30% | 31% | 32% | 33% | 34% | 35% | 36% | 37% | 38% | 39% | 40% |
| M/B | 100.40 | 100.42 | 100.45 | 100.48 | 100.51 | 100.54 | 100.57 | 100.59 | 100.62 | 100.65 | 100.68 | 100.71 | 100.74 | 100.76 |

Figure 20: Indexed Valuation Using M/B

The developments in each banks' value can be seen in appendix 26. All the banks can be included in this valuation, as they all have positive equities and thereby positive values, when using the M/B ratio.

Source: Bankscope, own calculations

³⁸⁶ Miles et al. (2012)

The banks' values were calculated by, firstly, extracting the banks' historical M/B ratios from Bloomberg, from 1994 to 2013, i.e. a twenty-year period, and secondly, calculating the average M/B ratio for each bank. The M/B ratio is now cyclically adjusted. Each banks' specific M/B ratio is assumed constant, when the Tier 1 ratio is increased. Thus, it is assumed that the values of the banks will revert to their historical mean. Thirdly, the effect on the book value of equity, when the Tier 1 ratio is increased, is now calculated. The lending rate increases with 0.035%, which is multiplied with the banks' lending amount per one percentage point increase in the Tier 1 ratio. The borrowing rate decreases with 0.127%, thus (1-0.00127) is multiplied with the banks' borrowing amount, per one percentage point increase in the Tier 1 ratio. As all other inputs in the banks' income statements are assumed constant, then one can see the rippling effect of a higher Tier 1 ratio on the banks' earnings. Fourthly, as the banks' dividend payout ratio is assumed constant, then the retained earnings are calculated by multiplying the new earnings with one less the dividend payout ratio. Hence, as earnings increase, due to the increase in the Tier 1 ratio, so will the retained earnings. Fifthly, the newly calculated retained earnings will then be added to the book value of equity for 2012, which then leads to the new book value of equity, given an increase in the Tier 1 ratio. Lastly, the new book value of equity is then multiplied with the historical M/B ratio, which then yields the new value of the bank at a higher Tier 1 ratio. A subsection of the dynamic excel model is illustrated in appendix 24, however, only for Swedbank and Banco Santander.

As an example, the value of Swedbank when the Tier 1 ratio increases from 12% to 13% will now be conducted using the above method. The historical M/B ratio for Swedbank was estimated to be 1.6 based on data extracted from Bloomberg. Swedbank's book value of equity was in 2012 €12,023 million. The value of Swedbank, at a Tier 1 ratio of 12% was therefore $\frac{M}{B} \times Book Value of Equity \rightarrow 1.6 * €12,023 million = €19,236 million.$

The lending rate is now increased with 0.035% and the borrowing rate is decreased with 0.127% following a one-percentage point increase in the Tier 1 ratio. The rippling effect of the changes in the rates leads to an increase in Swedbank's earnings from $\notin 1,789.79$ million $\notin 1,795.95$ million, when the Tier 1 ratio is increased to 13%. Next, the bank's dividend payout ratio is extracted from Bankscope and was 90.87% in 2012. The retained earnings can then be calculated by multiplying the new earnings with one less the dividend payout ratio, which is 1,795.95 * (1 - 90.87%) = $\notin 163.97$ million. The retained earnings are then added to the book value of equity for 2012, which

yields a new book value of equity of €12,023 million + €163.97 million = €12,186.97 million. The new book value of equity is now multiplied with the historical M/B ratio, 1.6 * €12,186.97 million = €19,499.15 million, which yields the new value of Swedbank with a Tier 1 ratio of 13%. Hence, Swedbank's value increases from €19,236 million to €19,499.15 million, when the Tier 1 ratio is increased from 12% to 13%.

Based on the above figure 20, it is apparent that the average value of the banks increases when the Tier 1 ratio is increased. For instance, when the Tier 1 ratio increases from 12% to 13%, i.e. an increase of 8.3%, then the average value of the banks' increases with 0.03%. If the Tier 1 ratio increases from 12% to 24%, i.e. a 100% increase, then the average value of the banks' increases with 0.34%. Lastly, if the Tier 1 ratio increases from 12% to 36%, i.e. a 200% increase, then the average value of the banks' increases with 0.65%. The figure indicates that a higher Tier 1 ratio leads to a higher value of the banks. The general value trend is as expected, as one had expected the values to increase, based on the above analyses. The reasons why the value would increase with higher Tier 1 ratios are the same as the reasons in the above P/E section, see section 7.4.3.1. Briefly, the value increases, because the banks are then perceived as being safer and the higher capital bases creates greater earnings potential for the banks, as they are then able to facilitate more loans, see section 7.4.3.1.

However, the average value increase is substantially smaller, compared to using the P/E valuation method. The average value increase is lower than expected, as the above figure shows, that there is almost no effect on the banks' valuation when increasing the Tier 1 ratio. There are several reasons as for why this might be the case. Firstly, the low value increase might be due to investors believing that it will be difficult for the banks to earn a fair return on the extra provided capital. If the value of the bank should increase proportionally with the increase in the Tier 1 ratio, then the banks have to be able to provide the same return on the new capital, as they did on the existing capital. However, it might be difficult to provide the same return on the new capital, because, foremost, the banks are not able to use all of the new capital to facilitating loans, as some has to be kept as a buffer simply to meet the higher capital requirement with, thus, no return will be earned on that capital. Secondly, due to the high degree of competition in the banking industry, see section 7.1.2, one might expect that the bank already has captured the most profitable customers. Thus, the new customers might not be as profitable, which will cause the banks to be unable to provide the same return on the new capital as

on the existing capital. Hence, the value increase might be lower because ROE might not increase, which would cause the banks' values not to increase, as ROE is often used to value banks with³⁸⁷.

Secondly, as the banks' earnings were low in 2012 and much lower than the book value of equities, then the earnings will only increase with a small percentage when the Tier 1 ratio is increased in this model. Thus, the increases in the book value of equity, at higher Tier 1 ratios, are small, in relation to the size of the book value of equity, which will cause the value increase to be small as well. Thus, based on how the dynamic valuation model is constructed the banks' values might not increase as much as expected. Thus, one should be careful of not reading too much into the low value increase.

In addition, there is one bank, KBC, which value declines when the Tier 1 ratio is increased. The decrease in value could be explained by the severe difficulties the bank faced during the Financial Crisis, where the bank had particularly high exposure to Eastern Europe and thereby incurred large loan losses³⁸⁸. KBC therefore received a government guaranteed loan in 2009 on which they had to pay interest³⁸⁹. However, the interest payments were booked as dividends, which resulted in KBC paying more dividends than they earned in 2012³⁹⁰. This would explain why the value decreased, when the Tier 1 ratio was increased, as the payout ratio is assumed constant. Thus, the bank would accordingly to the dynamic model at all times pay more dividend than earnings, which would make any bank decrease in value.

From appendix 26 it is clear, that the banks with larger market caps increases less in value, than the banks with smaller market caps, which was also discovered in the above P/E section. The average value increase, for the large and small market cap banks, can be seen in appendix 27. For instance, when the Tier 1 ratio increases from 12% to 24%, then the average value of the large banks increases with 0.17%. On the other hand, the average value of the small banks increases with 0.53%. This indicates that banks with already high valuations do not seem to benefit as much from an increase in the Tier 1 ratio. The reasons, why the banks with smaller market caps increase more in value are the same as analysed in the above P/E section, see section 7.4.3.1. Briefly, the values increased with different rates because large market cap banks are perceived as being safer and because investors focus on different factors when valuing small and large banks, see section 7.4.3.1.

³⁸⁷ Raaballe (2013)

³⁸⁸ Gazet Van Antwerpen I

³⁸⁹ KBC annual report 2012

³⁹⁰ Ibid.

Lastly, from the above figure 20, it was clear that the average values do not increase with as much as the increase in the provided capital. For example, when the Tier 1 ratio increases from 12% to 13%, which is an 8.3% capital increase, then the average value of the banks only increases with 0.03%. Thus, the provided capital increases with much more than the values of the banks. This trend was also found in the above P/E section, thus, one can interpret the results in the M/B model in the same way as the results was interpreted in the P/E section, see section 7.4.3.1. Briefly, one cannot firmly state whether it is socially optimal to place the capital in banks or whether the capital should be placed elsewhere, where it would generate a return higher than what the provided capital implies. However, the value increases, using the M/B model, are so small that increasing the banks' capital has next to no effect. This result could make one wonder if M&M's theorem actually holds in real life, despite the findings in section 7.3.1. The results indicate that changing the banks' capital structures substantially, has little effect on the banks' value, which is in line with M&M's theorem. One might therefore wonder what the optimal capital level for banks are and whether these results imply that the banks are close to the optimal capital level, as at the optimal capital level the banks' values might not increase nor decrease with higher capital levels, as for example was shown for the largest banks in the sample.

7.4.3.3 Sub Conclusion

The banks' forward P/E and forward M/B ratios were firstly calculated in the relative valuation analysis. Based on the ratios, it was clear that, especially the forward P/E ratio did not successfully value the banks. It was not as clear from the forward M/B ratios, however, when the banks' values were calculated in the '*improving valuation model*' section, 7.4.2, it became clear that the forward M/B model was not successful in valuing the banks either given this time period. Thus, in the '*improving valuation model*' section it was shown that the P/E ratio underestimated the banks' values with 21%, compared to the market cap values, and the M/B ratio overestimated the banks' values with 24.4%, compared to the market cap values. Further, the reasons for why the models were unsuccessful in valuing the banks were analysed, which was primarily because of the highly volatile stock prices, earnings and ROEs during this time period. Thus, going forward the twenty-year P/E and M/B ratios were used to mitigate the noise, autocorrelation, volatility and the causality problems.

Based on the scenario analysis, it can be concluded that the banks' values increased when the Tier 1 ratio was increased. This was as expected, as when a bank has more equity then they are able to facilitate more loans and are perceived as being safer, which will positively influence their profit and thereby valuation. By using the P/E valuation method, the average value increased with 0.72%, when the Tier 1 ratio increased from 12% to 13%. The average value increased with 8.7%, when the Tier 1 ratio increased from 12% to 24%. Lastly, the average value increased with 17.35%, when the Tier 1 ratio increased from 12% to 36%. By using the M/B valuation method, the average value increased with 0.03%, when the Tier 1 ratio increased from 12% to 13%. The average value increased with 0.34%, when the Tier 1 ratio increased from 12% to 24%. Lastly, the average value increased with 0.65%, when the Tier 1 ratio increased from 12% to 36%. Thus, there seems to be a consistent positive linear relationship between the increase in the Tier 1 ratio and the increase in the banks' average values. The two valuation methods yield more or less the same results. Even though the size of the value increase is different between the two models, then the results seem to indicate that the valuation methods are applicable. Nevertheless, the value increase, using the M/B method, is surprisingly low, however, it can be explained by the expected decrease in ROE and due to how the dynamic model was constructed. Thus, it can be concluded that the banks' average values increases to a low extent when the Tier 1 ratio is increased.

From the above scenario analysis, it is clear that the Tier 1 ratio increases at a higher rate than the average value. One could therefore have a hypothesis that states if one looks at the society as a whole, then the society seems to be better off by placing the capital somewhere else, where the increase in the value would be higher than the capital provided, because then the capital would generate more value than the capital is worth. One could also have a hypothesis that states even though the capital, placed in banks, do not create more wealth, in terms of return, then it is optimal for the society to place the excess capital in banks, due to the costs of financial instability and crises. Thus, whether it is socially optimal to provide the banks with more capital comes down to how the banks can earn a return on the excess capital combined with the costs of having future crises and financial instability. However, one cannot, based on this analysis, state whether the higher capital levels are optimal for the society as a whole or not. Nevertheless, as was stated previously in the thesis, the capital levels before the Financial Crisis were obviously too low³⁹¹. However, scholars and practitioners do currently not agree whether the capital requirements should be 11% or 18% in terms of Tier 1 capital.

³⁹¹ Rangvid (2013)

It is however clear that tying up more capital than necessary in banks is not socially optimal³⁹², especially, as banks might not be able to earn as high a ROE on the extra capital, as some of the extra capital will only be used as a capital cushion, thus, will not generate a return at all.

One should remember to interpret the conclusions within the frame of which the conclusion were reached. The robustness of this scenario analysis is somewhat low, as many assumptions were necessary to make. Thus, the generalizability of the conclusions are low and the conclusions might not be applicable, to other banks in the real world, without the assumptions. The real world is considerable more dynamic than this model indicates, as many more relations are affected by an increase in the capital requirements, many of which this thesis was unable to include.

³⁹² Bloomberg IV

8. Conclusion

The thesis sought to answer the question to what extent a higher Tier 1 ratio increases or decreases the banks' value. This question was answered through five interrelated analyses, whereas four sought to answer their own specific sub-questions. This lead to the fifth analysis, which established the frame needed to answer the overall research question, using inputs from the previous analyses.

The first analysis was a strategic framework analysis, which sought to analyse whether the banks were able to affect their own profitability level, given the external environment. The main finding of this analysis was that the external environment, in particular the economic, political and legal environment, heavily influenced the banks' profitability level. The economic factor influenced the banks' profitability level directly through interest rates, inflation rates and growth in the GDP. The political and legal factors influenced the banks' profitability level indirectly through regulation and requirements, which satthe frame in which the banks were able to operate. Thus, these three factors greatly influenced the banks' profitability level. However, the banks were not able to affect these factors to any extent. In addition, it was found that the banking industry was highly competitive, which further influenced the banks' profitability level. The degree of competition was a result of many factors, two of which were the bargaining power of buyers and suppliers. It was found that retail buyers had a lower bargaining power, which might make the banks able to affect these customers, by, for example, being able to increase their lending rates. However, the corporate customers were not found to have a low bargaining power, thus, it is not expected that the banks can influence these customers to any significant extent. Further, it was found that neither deposit and wholesale suppliers had significant bargaining powers, nor had the bank, thus, it is not expected that the banks can influence the suppliers to any significant extent. Thus, it was concluded that the economic, legal and political environments, as well as, the degree of competition, the bargaining power of buyers and suppliers greatly affects the banks' profitability level. However, the banks were only able to affect the retail buyers to a small extent. The banks are, therefore, only able to affect their profitability level next to no extent.

The second analysis was an analysis of the financial value drivers. The analysis sought to answer what affected the financial value drivers from 2006 to 2012. Based on the analysis, it was found that the state of the capital markets, the interest rate level, the GDP, the loan losses, the availability of debt, the capital requirements, the banks' lending and borrowing rates, the banks' business models

and the banks' lending policies all affected the financial value drivers. Moreover, it was found that the overall state of the economy and the general economical conditions greatly affected the value drivers. Further, it was found that the NII, the cost-to-income ratio, the loan loss impairments and the leverage ratio all affected ROE.

The third analysis sought to analysis to what extent Modigliani & Miller's theory would hold, based on data from this thesis' sample banks. This was analysed by using the same approach as Miles et al. (2012), and through multiple regression analyses. The effect of M&M's theory, in real life, was between -4.08% to 6.25%, with no taxes, based on the level and first difference regressions respectively. The effect of M&M's theory, with taxes, was between -4% and 3.66%, based on the level and first difference regressions respectively. Thus, it can be concluded from the analysis that M&M's theory holds to a low extent, in real life, as the effect of M&M's theory is close to zero.

The fourth analysis sought to investigate how a higher Tier 1 ratio affects the banks' financial statements. It became evident that multiple complex, interrelated and counteracting relationships existed between the Tier 1 ratio and the banks' financial statements. To facilitate the analysis, within the page frame of the thesis, a simple model was developed, only focusing on the most important factors, in terms of this thesis' focus affecting the financial statements. The findings of the analysis were that the higher Tier 1 ratio directly affected the amount of retained capital, the cost of facilitating the loans, the equity amount, the banks' risk and thereby their borrowing rate. Further, it became clear, that the higher Tier 1 ratio was likely to force the banks' management to increase its lending rate as the banks wishes to pass on the higher needed income to lend on to the customers. Thus, is can be concluded that a higher Tier 1 ratio affects the banks' financial statements through retained capital, cost of facilitating the loans, equity amount, risk, borrowing rate and the lending rate. Nevertheless, a higher Tier 1 ratio also affects the banks' financial statement through the required rate of return on equity, ROE, required earnings, loan portfolio, total assets and the credit rating. However, these factors were not used in the further analysis, due to the limited page frame. Lastly, one should be aware that these lists are not exhaustive, but of main interest, due to the overall focus of the thesis.

The fifth analysis began by calculating the banks' forward P/E and M/B ratios. However, due to the significant volatility in the stock prices, earnings and ROEs, during the time period, using these ratios

resulted in too much noise, autocorrelation and causality problems. Hence, the ratios used for the further analysis were the historical twenty-year P/E and M/B ratios. The subsequent scenario analysis then sought to analyse to what extent the banks' values would increase or decrease due to an increase in the Tier 1 ratio. The finding of this analysis was that the banks' values would increase when the Tier 1 ratio was increased. It can be concluded that, using the P/E valuation method, the extent to which the banks' values increased was as follows: the average value increased by 0.72%, given an increase in the Tier 1 ratio from 12% to 13%. The average value increased by 8.7%, when the Tier 1 ratio increased from 12% to 24%. Lastly, the average banks' value increased by 17.35%, when the Tier 1 ratio was increased from 12% to 36%. Further, it can be concluded that, using the M/B valuation method, the banks' values increased as follows: the average value increased by 0.03%, given an increase in the Tier 1 ratio from 12% to 13%. The average banks' value increased by 0.34%, when the Tier 1 ratio increased from 12% to 24%. Lastly, the average value increased by 0.65%, when the Tier 1 ratio was increased from 12% to 36%. There seems to be a consistent positive linear relationship between the increase in the Tier 1 ratio and the increase in the banks' average values. The P/E and M/B valuation methods yielded similar results, even though the value increased with different rates. However, the value increase, using the M/B method, was surprisingly low. Nevertheless, it can be concluded that the banks' value increases to a low extent when the Tier 1 ratio was increased.

Lastly, it must be stressed that the conclusions are understood and interpreted within the frame of the thesis. Hence, one should realise that the assumptions made reduce the ability to generalise the results. Thus, the conclusions cannot directly be applied to, for example, American, Asian or even smaller banks, because of the significant assumptions made. Due to the many and significant assumptions, the robustness of the scenario analysis is somewhat low. The real world is considerable more dynamic than the scenario-analysis-model indicates, as many more factors are affected by an increase in the capital requirements, many of which this thesis were unable to include. Thus, the conclusions might under- or overestimate the actual influence of a higher Tier 1 ratio on the banks' valuation. Nevertheless, the conclusions are considered valid, as long as one understands the results within the frames of which they were reached.

9. Discussion

The following discussion is based on points for further research the authors find interesting.

It is clear that the investigated time period was an abnormal period, which might have biased the overall findings. Thus, it would be interesting to examine the same research question by using data from, for example, 1980 to 2013. Thereby, one could have explored the changes in the banks' capital levels, from before Basel I to Basel III, and how these developments have affected the banks' profitability, lending and borrowing rates and financial statements. Furthermore, it seems to the authors, as if the banking sector is in the middle of a paradigm shift, as it seems that the new requirements lead to new bank business models, such as 'boring banking', enhanced cost focus and shadow banking. It would therefore be interesting to investigate how the Banking Union, the Single Resolution Mechanism and future regulations would affect the banking industry, the banks' profitability, financial statements, business model and lending and borrowing rates. Thus, it could be of interest to conduct the same analysis, in a couple of years, to evaluate what the effects have been from the capital requirements, Banking Union and Single Resolution Mechanism.

In addition, it would be noteworthy to research whether the conclusions of the thesis would change if, for example, the focus were solely on all the G-SIFI banks. Thereby, one could comment on the effect of higher capital requirements on the global financial industry and societies. Further, it would be of interest to look into the effect, on the conclusions, if more banks were included in the sample.

Lastly, it would be interesting to base the scenario analysis on a more dynamic model, where the model could have taken the changes in the P/E ratio, M/B ratio, the financial statements, non-linear developments and changes in the capital buffers into consideration. The authors would then have expected the banks' values to have increased and then decreased, as the Tier 1 ratio was increased. It would therefore be of interest to investigate if there is a socially optimal capital requirement level. Further, it would be of interest to investigate how the Core Tier 1 and Tier 2 capital would affect banks' valuations at higher capital levels. One might argue that the real constrain for banks is the Core Tier 1 capital, as the banks can more easily issue Tier 1 and Tier 2 capital. Thus, it might be more difficult for the banks to meet higher Core Tier 1 capital levels, which is why it would be interesting to investigate how higher Core Tier 1 capital levels affect banks' valuations and financial statements.

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