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Financial disclosures in the European banking sector - An analysis of the Level 3 hierarchy

Master thesis

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Abstract

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Title: Financial Disclosure in the European banking sector – an analysis of the Level 3 hierarchy

Background: The large reorganisation of financial instruments in the US banking sector prior to the recent financial crisis and the effects related to the crisis, raise concerns of similar accounting disclosures in Europe. The valuation of the Level 3 financial instruments is based on unobservable inputs and the instruments shall be valued at their fair value, in which information asymmetry may present itself through the subjectivity in the valuation mechanism.

Research scope: The study is built on the notion that a high amount of Level 3 financial instruments results in a higher cost of capital. In relation to the main objective we have included control variables representing an overview of a bank's business. The control variables are also subject to an in depth analysis.

Research design: The correlation between Level 3 instruments and the cost of capital is examined through a statistical research, using CDS as a proxy for the cost of capital. The study consists of approximately 50 listed banks actively operating in the European Union, reflecting a large proportion of the asset base within the banking sector. The Level 3 variable as well as the control variables is examined through a linear regression analysis.

Limitations: The study is limited to banks within the European Union as they are subject to the same economic regulation. The amendments to IFRS 7 were implemented in January of 2009 and as such the study encompasses both of the available years in order to establish a sound base of analysis.

Empirical findings: We find no significant relationship between the amount of Level 3 financial instruments and the banks cost of capital. However, for 2010 the multiple regression analysis present depicts a significant relationship regarding the control variables as well as exhibiting a correlation to the cost of capital.

Further research: We propose that future research include information observed over a longer period of time as well as examines an extended economical area due to the difference in the results received.

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1. Introduction

Background and Problem discussion

The background to this paper is the belief that a weak quality of information and higher uncertainty leads to a higher cost of capital. New accounting policies regarding disclosures on financial instruments were implemented to IFRS 7 on January 1 2009 in which the disclosure of the fair value of an entity's financial instruments is based on a three-level hierarchy. Due to the recent financial crisis in 2008 and many banks' large exposure to Level 3 financial instruments we have decided to make a statistical research based on the instruments in the third level of the hierarchy (unobservable inputs) and on the price of the Credit Default Swaps (CDS). The intension is to establish if there is any correlation between the proportion of financial instruments with lower information requirements and the cost of capital in the banking industry. We will begin with a short synopsis of what we think are important factors which lately resulted in the financial crisis of 2008.

In 1998 the hedge fund Long-Term Capital Management, managed by Nobel-Prize laureates Robert Merton Jr. and Myron Scholes collapsed (Taleb, 2007). The hedge fund was focused in the trading of governmental bonds with a high leverage. With the strategy based on advances mathematical formulas, the fund had about three billion in assets and was leveraged up to 1.25 trillion dollars (Wipperfurth, H., 1998). Interestingly, the collapse of LTCM did not have any notable effect regarding this type of risky behaviour in the marketplace (Wipperfurth, 1998).

In the United States there are two large governmental sponsored enterprises in the secondary mortgage market, Fannie Mae and Freddie Mac. The function of the secondary mortgage market is ensuring other institutions such as, banks that they have the liquidity needed to provide loans to the housing market. In the late 20th century former US president Bill Clinton developed a new economic strategy for the mortgage market. It was based on the principle of making it easier for people to own their own homes (Coy, 2008). In order to encourage banks to extend their home mortgages, Fannie Mae decided as early as in 1999 that it would ease up on its credit requirements on loans purchased from other banks (Holmes, 1999).

This type of underlying loans, including various types of debts, became known as sub-prime loans due to its focus on customers with poor credit rating, who often came from rather poor conditions (Coy, 2008). The loan is called sub-prime because it does not qualify to be a prime loan. Sub-prime loans were often bundled with a mixture of other debts into Collateralized Debt Obligations (CDO's) and sold as mortgage bonds to investors.

In the beginning of the 21st century the technology bubble collapsed. The Federal Reserve began to take action in order to stimulate the economy by cutting interest rates from 6.5% in January 2001 to around 1% in June 2004. Credit became very cheap. Readers should also have in mind that it is very difficult for a central bank to control where the money is flowing. A large proportion of the cheap credit began to flow into the real estate sector (Thoma, 2009).

From this record-low interest rate, the Federal Reserve began raising the interest rate in small steps up to 5.35% by August 2006. The higher interest rates began to put pressure on the housing market, especially on the customers with poor credit rating. Moreover, many customers had not really comprehended the indexed ladder model on which the sub-prime loans were built, which aggravated

the crisis (Bäckström and Forsell, 2008). The house-market became flooded with vacant houses, which resulted in declining prices. This led to a default of sub-prime loans and severe consequences arose within the financial markets globally. The final “nail in the coffin” was when, in 2008, the 158 year old bank Lehman Brothers filed for reorganization according to “chapter 11” under the US bankruptcy laws — the American equivalent to the Swedish “Lag om företagsrekonstruktion”.

An early example of how the crisis spread across Europe is the French bank BNP Paribas which on the 9th of August 2007 announced that due to failures in assessment of asset values, the investors in two of its funds would not be able to extract their investments. The English market also became an early warning sign when Northern Rock experienced a bank run in September 2007 (BBC News Online 2009-08-07). However the crisis spread across Europe and many banks had to receive help from its governments and the central banks in order to stay afloat. Since then, a number of European countries and central banks have experienced having their interest rates cut in order to stimulate the economy.

The impact of the financial crisis made the International Accounting Standards Board (IASB) intensify its on-going work of improving the regulation of financial instruments, work that began more than a decade ago (Marton, 2008). The need for improvements in the regulation derives from the growing part that financial instruments play in risk management in companies (Marton et al., 2010) and is a concern shared by both IASB as well as its American equivalent, the Financial Accounting Standards Board (FASB). The two organisations announced in 2008 that they would work together towards common standards regarding off balance sheet activity and the accounting for financial instruments (IASB press release 2009-03-24).

An important accounting issue in regard to this crisis is how the financial instruments should be valued on a banks’ balance sheet; it has been widely debated whether banks ought to value the financial assets and liabilities by their fair value or by their historical cost value.

Research by Barth et al. (1995), analysed the difference between fair value measurement¹ and historical-cost accounting on a valuation basis of banks financial instruments. In their research they recognised that banks’ earnings power became more volatile under fair value measurement. They also concluded that banks more often infringed on the regulatory requirements when they valued their assets by fair value measurement.

Laux and Leuz (2010) go through the typical asset allocation of US banks categorised after the size of their assets; small banks with assets ranging from \$1-100 billion, large banks with assets above \$100 billion and the large US investment banks. The largest asset class for big and small banks is loans and leases consisting of about 50% of their total assets. For an investment bank the largest holding is collateralised agreements, essentially 33% of their assets, which they normally are holding under a short period of time. This means that half of a bank’s assets and one third of an investment bank’s assets are subject to fair value measurement. Research have shown (Walton, 2004) that many banks were unsatisfied with the fair value measurement on assets available for sale or held for trading, because it potentially could cause great fluctuations in the assets.

¹ The concept of fair value measurement will be explained in depth further on.

According to IFRS 7 (p. 27A) there are three levels of classification of fair value on the balance sheet. These levels are based on:

- Quoted prices (unadjusted) in active markets for identical assets or liabilities. [Level 1]
- Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices). [Level 2]
- Inputs for the asset or liability that are not based on observable market data (unobservable inputs). [Level 3]

Notably during 2007 many banks with large trading portfolios and real estate exposure began to use cash flow based methods to value their financial instruments. This means that changes took place on the banks' balance sheets; instruments classified at Level 3 increased while Level 1 instruments decreased.

For example Citigroup transferred \$53 billion whereas other affected banks such as Merrill Lynch, Bear Sterns and Lehman transferred up to 70% of their pre-crisis balance (Laux and Leuz, 2010). However, it is unclear whether they reclassified their financial instruments in order to avoid big write-downs and a negative spiral or if valuing their instruments by unobservable methods actually was the proper method. Most of the problematic instruments related to the crisis belong to Level 2 or Level 3. In regard to the fact that Level 2 instruments could be valued after related transactions we have decided to look deeper into the Level 3 instruments. When it comes to Level 3 instruments, the lack of information may become an issue as the instruments are valued after unobservable inputs and therefore may cause problems for the users, such as investors, regulators and auditors. Since this study is based upon the belief that the amount of Level 3 financial instrument affects the banks' cost of capital, the underlying information asymmetry plays a key part.

Research made by André et al. (2009) refers to an article by the French researcher Vinals (2008) who in regard to the cash flow models explained that valuation models had been made in a favourable economic context. Many models did not sufficiently take into account that the assets were risky, since many of the instruments were based on subprime mortgages, which are very sensitive to changes in interest rate, prices of property and persuasions of lenders. According to André et al. Vinals claim that the correlation between defaults in these instruments was underestimated.

We therefore find it interesting to relate the level of instruments in Level 3 of the hierarchy to the banks' cost of capital. In order to be able to compare the banks we will start by obtaining the relation between the amount of Level 3 instruments and the banks' equity. As explained earlier, the input of information (unobservable market data) on which the valuation of the instruments in Level 3 is based, could potentially mean a higher uncertainty and might lead to a higher cost of capital. It is our belief that the banks low equity positions could lead to a negative equity position if a write-down would occur.

The cost of capital will be measured by using the price of the individual bank's Credit Default Swap as of the last trading day for both of the two years respectively. The study will also include a set of control variables, in order to make the research more reliable.

Research question

Based on the discussion in our background and problem discussion, we have formulated the following hypothesis:

Banks with higher amounts of Level 3 financial instruments, in relation to equity, also have a higher cost of capital.

Aim

The aim of this research is to examine whether there is any correlation between high amounts of Level 3 instruments in regard to a higher cost of capital. The lack of observable market data in the information in Level 3 instruments is a reason to believe that it could lead to higher costs of capital. In order to get comparable figures between banks in different segments, sizes and geographical areas we will relate the amount of Level 3 instruments to the bank's equity.

The knowledge of the relationship between the Level 3 instruments and the cost of capital (via CDS) may be useful in the assessment of the individual banks' health.

Research scope

We have selected to limit the scope of our study to listed banks within the European Union as we find it interesting to study the consequences of the recent financial crisis and its effect on the European banking sector. Since we are interested in the three-level hierarchy of IFRS 7: Financial Instruments – Disclosures, the study is restricted to banks complying to IASB standards.

Due to the fact that the implementation regarding the disclosure of financial instruments in IFRS became active in 2009, we find it reasonable to study both of the two business years that are available since the implementation.

We have therefor decided to test our hypothesis for the financial years of 2009 and 2010. For obvious reason the banks have to have released their annual report no later than when we start the statistical approach, and made it available for us on their webpage or other media. Prior to the annual reports we have also decided to use the prices from the last trading day in 2009 as well as 2010 of the Credit Default Swaps and use the prices for each banks CDS as their cost of capital. The CDS's we are using are all expiring in 2012 and the majority have a total term to maturity of five years. Our control variables is based on different aspects in a bank's business describing different areas with a target of getting a wider understanding of what the market considers to be important in relation to the banks' cost of capital. The control variables will be analysed in order to obtain an in-depth understanding of the result and the importance of the aspects, individually as well as together.

2. Research design

Gathering of information

The initial phase of our study includes gathering information, enabling us to make a review of the subject. For this purpose we used databases, such as the Business Source Premier, accessible to us through the Gothenburg University Library, and other available literature or media. Scientific articles have been searched for, primarily, using the Business Source Premier database even though occasionally an article has been accessed through Google Scholar. In addition to scientific articles we turned to press releases and other published media, such as the Conceptual Framework and Basis for Conclusion, issued by IASB in context to the standards used in this essay e.g. IFRS 7. Gunda and Factiva were used in order to get a point of view from other, academically as well as non-academically, sources. For inspirational use we accessed essays by previous students of Gothenburg University.

In order to narrow the search criteria we used keywords such as IFRS 7, information asymmetry, Level 3, crisis, financial instruments etc. This enabled us to select articles of high relevance for our research.

Study

The aim of our study was to find whether there was any correlation between a high amount of Level 3 assets and a higher cost of capital. We use the price of the Credit Default Swap on senior debt for each bank as a measurement of the cost of capital. The CDS is measuring the risk of default of the bank and since it does not take other aspects in to consideration e.g. interest rates such as EURIBOR and LIBOR, we consider it to be a good proxy for this study.

Through the Gothenburg University Library we accessed the databases Bankscope and Datastream, which provided us with much of the information needed. The only information not provided were the information about the amount of Level 3 instruments, which were available through each banks annual report.

We have chosen to study listed banks in the European Union. On an accounting basis the banks had to follow the IFRS regulation since it is here we find the three-level hierarchy of IFRS 7, albeit the same regulation is available in US GAAP. Moreover, since neither of us is fluent in any languages other than Swedish and English in the sense that it would enable us to get a comprehensive understanding of the context, we also restricted the research to banks with financial reports in these languages. We also sought to have a coherent basis for the banks involved in the survey and chose an area where the entities are subject to the same economic regulation and set of standards; hence the European Union. Most of the banks use the same currency, which also made nations within the EU applicable as the geographic area of interest. In addition to this, we chose to study listed banks due to the comprehension that they are of a higher probability to have CDSs available. The banks used in our statistical test also have reliable price data of Credit Default Swaps with a matching term to maturity.

1. World Region/Country: European Union, enlarged	7,551
2. Accounting standards: International Financial Reporting Standards (IFRS)	3,839
3. Listed banks	2,482
Boolean search : 1 And 2 And 3	
	TOTAL
	234

Fig. 2.1 – Search criteria in Bankscope.

Using the criteria described, Bankscope provided us with a list of 234 available banks. However, in order to get the banks that were to be included in the study we had to cross-reference the list manually with DataStream. In our search for the banks' CDSs we used both the built-in five-year Thomson CDS database as well as a manual search, which method we chose was merely a matter of our own preference.

Out of the 234 banks corresponding to the pre-set requirements in Bankscope, only 49 had CDSs available (2009) and 47 (2010). In order not to receive a misleading result it is of importance that the CDSs have the same remaining time to maturity.

Our aim has been to acquire CDS's with a five-year maturity, ending in 2012 — which were applicable for the majority of the banks.

In order to retrieve the banks' annual reports we accessed the webpage of each bank. For most of the banks the annual report was easily available through the "Investor Relations" tab. However, when this was not applicable we used keywords such as "Annual Report" or "Financial Report" and performed a search in the banks' built-in search bar or through www.google.se.

The sought after information was generally available through the bank's annual report, although some banks established a separate document containing the financial information. In those cases we once again accessed their webpage in search for the report if we had not already retrieved the document.

The amendments to IFRS 7 became active on January 1, 2009. This means that information regarding the three-level hierarchy is only available in the annual reports of 2009 and 2010. In order to improve the basis for the study and our analysis we chose to use both of the available years

After retrieving the 2009 and 2010 annual reports for the banks (in some cases the financial report as well) we accessed the documents and using keywords like "level" or "hierarchy" we searched for the amount of financial instruments measured by unobservable inputs (Level 3 instruments). Since the annual reports are allowed to differ from each other in regard to the layout, this kind of search was not applicable for some of the entities. In those cases we made a "manual search" in the sense that we examined the index in search for the appropriate note, which held the information we needed. The same procedure was implemented regarding the retrieval of the banks' equity.

Out of the 49 remaining banks suitable for this study, three more banks were made inappropriate due to the absence of financial instruments measured using unobservable inputs (Level 3 instruments) for the year 2009. Regarding 2010, eight banks did not release their annual report in time to be included in the study and one bank did not have any financial instruments measured using unobservable inputs.

In order to find reliable information for our control variables, we used the Bankscope database, Moody's and the annual reports respectively. In order to acquire the rating for each country, we accessed our account at Moody's online services and using the search string "Government of ...", we

were able to obtain the rating. The total assets were retrieved from the annual reports from which we also extracted the figures in order to calculate the debt to equity ratio. The Tier 1 ratio was also retrieved from the annual reports and the Bankscope database. The information used in calculating the five-year average of the return on equity, were retrieved from the Bankscope database, using the period of 2005-2010. We exchanged all the figures to Euro, using exchange rates retrieved from the European Central Bank.

The figures from the annual reports were exported to an Excel-sheet, together with the information gathered from Bankscope as well as Datastream, in order to simplify our review.

Statistical approach

The gathered data were subsequently exported to SPSS, enabling a statistical test of the potential correlation between our variables. We use a simple regression analysis, as well as a multiple regression analysis in order to determine the correlation and the strength between the variables. The regression models are based upon the following equations displayed in figure 2.2. The regression is analysed exercising a 95% confidence level².

Equations for the linear regressions	
Simple	$CDS = \beta_0 + \beta_1 * \text{Level 3} + \epsilon$
Multiple	$CDS = \beta_0 + \beta_1 * \text{Level 3} + \beta_2 * \text{Rating} + \beta_3 * \text{Size} + \beta_4 * \text{Debt-to-Equity} + \beta_5 * \text{ROE} + \beta_6 * \text{Tier 1 ratio} + \epsilon$

Fig. 2.2 – Regression equations.

² The statistical model will be explored further in the Empirics chapter.

Control Variables

In our statistical research we have included several control variables. The aim when choosing our variables has been to cover as many of the aspects considered important to our business segment, as possible. The aspects we consider to be important to the study are profitability, size, leverage, operational environment and financial strength. There are other aspects that could be of importance to control for in regard to the cost of capital but we consider the stated aspects as reasonable.

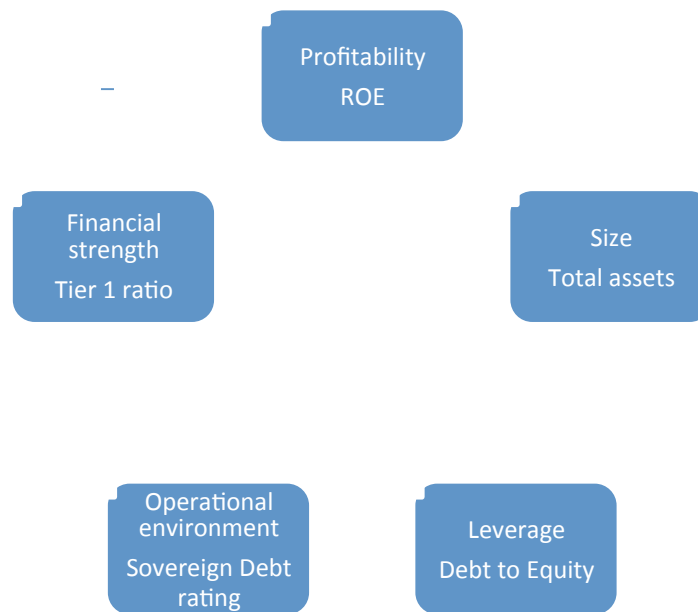


Fig. 2.3 – Control Variables.

Profitability

As a measurement of profitability we are using a five-year average Return on Equity. Return on Equity (ROE) measures how well the company generates value from its investments and helps investors to a better understanding of the course taken within the company's operations. Profitability is an appropriate metric due to its fundamental role in the value generation of a company (Hao et al. 2011). The reason for using an average over five years is that we think that it tells us how well the company manages its capital throughout a cycle, which we consider to be a more reliable metric. One of the benefits of using a five-year average is that the figures will not be subject to a particular write up or write down for a specific year. The return on equity metrics is not subject to any particular size of the company, however, a higher return on equity could also mean a higher leverage position. A long-term well-managed business could lead to lower costs of capital.

Leverage

In order to measure the companies leverage position we are using the Debt to Equity ratio. We consider leverage as an important variable since research has shown that the high leverage positions in financial institutions may be a cause to the recent financial crisis. Another important aspect is the fact that a higher leverage position increases the probability of a default (Roll 2011). The Debt to Equity ratio shows the proportion of the company's assets that is financed with debt in its

operations. It could also be more difficult for companies with higher Debt to Equity ratios to meet its obligations and as such a high Debt to Equity ratio could be subject to higher cost of capital for the entity.

Size

The size of the assets on the balance sheet could be a contributing variable to the price of the CDS. A bigger bank with a higher value of total assets could have more resources to handle a tougher business environment than a small bank. In various crises the smaller banks have been merged into larger bank entities as a step to reorganise the banking system. Some examples are the Mexican crisis in the mid 1990's (Yácamán 2001) and the recent financial crisis in 2008 where many banks emerged into larger banks as a reorganizational step of the banking sector.

Operational Environment

We believe that the operating environment is an important variable for our statistical research. Our conclusion is that the best way to judge the operating environment is through the countries sovereign debt ratings. There are several important aspects in the operating environment, which we consider to be important.

The economic stability in a country is of importance to the banking sector, a high GDP per capita, for instance, is important since it represent a higher purchasing power among the population and the capability to handle bigger crisis if they occur. A lower fluctuation of GDP is also important, since it could give a better quality of the business assets. For example, assets in an economically stable country will most likely not fluctuate as much as in an unstable country, leading to a more stable earnings power. Reliable political institutions are important for a bank in its business. Political initiatives such as, higher taxation and other competitive disadvantages for example disrespect of property rights could be very costly for the bank. Lately, during the crisis when many banks had liquidity problems, a well functioning central bank combined with the country's ability to provide the bank with loans and liquidity and possibilities to invest in the economy have also been important (Moody's, September 2008)

Financial strength

The Tier 1 ratio is a method of measuring the banks financial strength, taking several aspects into account. The Tier 1 ratio is considered to be one of the most important metrics in banking as it expresses the banks' level of risk-adjusted assets (McCune 2008). The ratio is also closely combined with the Basel regulations in which the banks need to have a Tier 1 ratio above 8%.

The picture below describes how to calculate the Tier 1 capital³.

³ Based upon the calculation of Tier 1 Capital in the Swedish Handelsbank's Annual Report 2010.

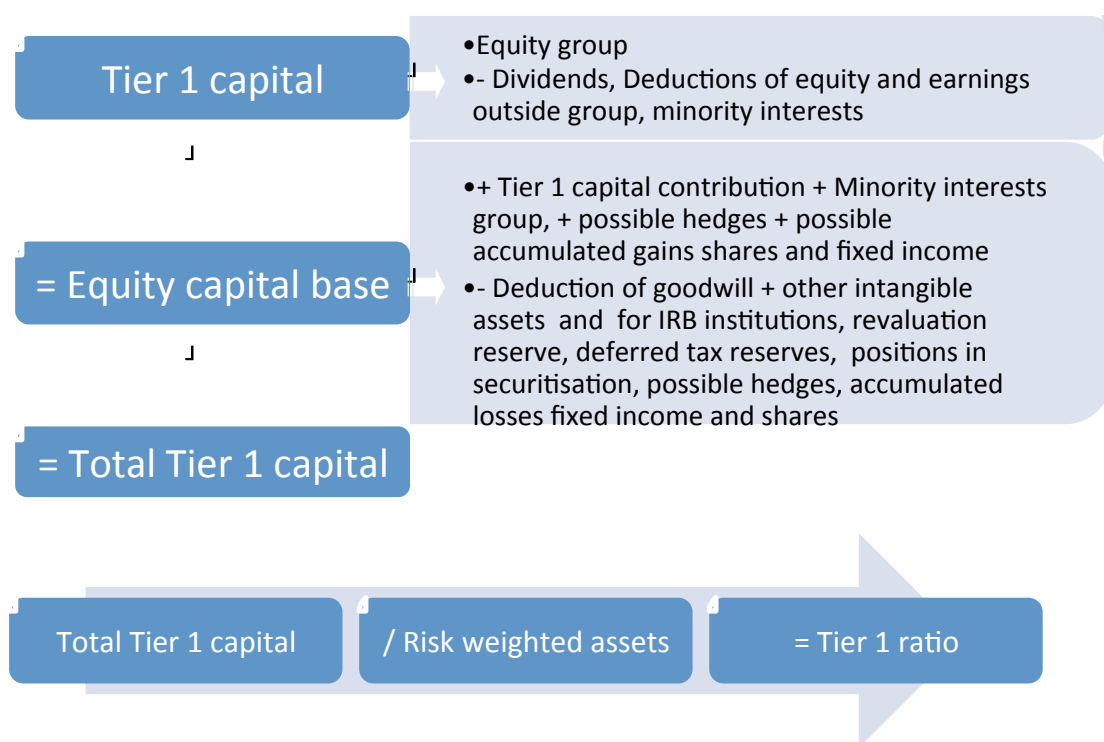


Fig. 2.4 – Description of Tier 1 ratio.

The Tier 1 ratio is calculated by dividing the Tier 1 capital with the risk-weighted assets set by the Basel II requirements. After reviewing the annual reports, we found the Basel 1 requirements to be tougher regarding risk-weighted assets than the Basel II requirements. Most banks disclosed that the Tier 1 ratio would have been lower measuring the risk-weighted assets using the Basel 1 requirements instead of Basel II.

Bank for International Settlements

The bank for international settlements is the oldest financial institution in the world and is situated in Basel Switzerland. The bank was established in 1930 and is still today a centre for international banking cooperation. The BIS main focus is to achieve monetary and financial stability. The latest banking standard to be implemented is the Basel III standards and the BIS published its Basel III rules on December 16 2010. Some of the requirements for banks to meet in regard to the standard are to have a Tier 1 capital ratio above 8%, a liquidity coverage ratio above 100% and a net stable funding ratio above 100%. In order to meet the new standards the banks have until 2015 to meet the liquidity coverage ratio and to 2018 to meet the net stable funding ratio. The target for full Basel III implementation is 2019.

- Liquidity Coverage ratio = Stock of high quality liquid assets / Total net cash outflows over the next 30 calendar days.
- Net Stable Funding ratio = Available amount of stable funding / Required amount of stable funding.
- Tier 1 ratio = Total Tier 1 capital / Risk weighted assets.

We have, however, decided to only use the Tier 1 ratio in the study as a measurement of financial strength.

Research approach

The main objective in this study is to locate any potential correlation between the amount of an entity's financial instruments measured by unobservable inputs (Level 3 instruments) and the cost of capital. In order to do so, we started by presenting a frame of reference. Patel and Davidsson (1994) describe this first segment as an exploratory approach in order to gather a sound base of information in regard to the research area. How this information was gathered is explained in detail in other segments of this study. The information and knowledge gathered will also be used as the foundation upon which we analyse the data gathered in our second part of the study — the descriptive approach (Patel and Davidsson).

The data gathered in the empirical section will then be presented and analysed in the descriptive section of this study. We will in this section determine whether we found a correlation between the amount of financial instruments measured in unobservable inputs (Level 3) and the banks' cost of capital.

Reliability and Validity

The overall ambition of any study is to obtain as reliable results as possible, leading to a high validity for the research as a whole and a sound basis for analysis. In itself, validity is a dimension of the absence of systematic error of measurement (Körner and Wahlgren, 2002). In other words, we must ensure ourselves as researchers that we study the object or problem on which we built the survey. A common way in which validity will diminish in this type of studies, that is studies based on gathering of observations and data, is the occasional mistyping when entering the data from the primary source to e.g. a sheet of paper. Throughout the gathering of the data, we made sure to minimise processing errors regarding the figures we retrieved by meticulously double-checking each other's numbers and correcting them when necessary i.e. a double observer approach. When we had difficulties recognising data in the annual report, we retrieved the numbers through the Bankscope database. By doing so we established a high trustworthiness and reliability in this study. The number of categories of observations involved can also affect the reliability of the data, i.e. the larger the survey the higher propensity of processing errors.

Patel and Davidsson (1994) claim, however, that a high reliability of the data in a study is not a guarantee of high validity, but a pre-requisite of the same. A study has to be reliable in order for the researcher to truly comprehend what it is he or she is measuring.

In this study, we use a large amount of data reflecting different areas on a bank's balance sheet, i.e. a quantitative research. Our variables e.g. Level 3 financial instruments, Debt-to-Equity ratio and Tier 1 ratio is retrieved through the annual reports where the figures have been calculated and or gathered by the entities themselves, following the IFRS regulation - which has later been audited. In our opinion this gives certain reliability to the figures themselves. However our sovereign debt rating is retrieved from a private company and only reflects opinions based on their analysis.

3. Frame of reference

Accounting Principles

According to the IASB, financial information has to fulfil certain criteria. The information must be useful i.e. the information must be relevant as well as faithfully represent what it is intended to represent. Relevance and faithful representation is said to be fundamental qualitative characteristics (Conceptual Framework QC5).

In order for the information to be useful it must be both relevant and faithfully represented. Information that is an unfaithful representation of a relevant occurrence or a faithful representation of an irrelevant phenomenon does not help users make good decisions.

Relevance

Relevant financial information could make a difference in a users' decision-making. The information may affect a decision even though the user is aware of the information, through other sources, or if the user chooses not to take advantage of the information.

To be able to make a difference in decisions the financial information needs to possess; either a predictive value, a confirmatory value or both. If users can use the financial information as an input in the process to predict future outcomes, it is said to have a predictive value. This value does not mean that the financial information should be seen as to be a prediction but that the users use the information, when making their own predictions. In contrast to the predictive value the confirmatory value denotes that the financial information provides feedback regarding previous evaluations.

A certain interrelation exists between the predictive value and the confirmatory value of financial information, information that can be determined to have a predictive value is also often noticed to have a confirmatory value (QC10). The information on the current year revenue may for instance be compared with last year's prediction as well as it can be used as a basis for predictions of future revenues. The comparison with previous predictions can help users to develop the methods used in order to get more accurate forecasts in the future.

Faithful representation

A financial report provides words and numbers describing an entity's economic occurrences and in order to be useful the information in the report must, not only be relevant but also faithfully represent what it is intended to depict. The IASB Conceptual Framework refers to the characteristic of a perfectly faithful representation. The information needs to be complete, neutral and free from error. There are, however, no requirements of perfection but the objective is to maximise these qualities to the utmost extent.

The information is said to be complete if it include all the information, including explanations, necessary to make the user understand the occurrence being depicted. For instance, the information ought to include, no less than, the nature of the economic occurrence, a numerical depiction as well as an explanatory description of the numerical depiction (QC13).

Financial information that is without any bias in the selection or presentation is neutral. A neutral depiction is characterised by not being manipulated in order to influence the way that users will receive the information. The neutrality of the information does not implicate that it is without

purpose or influence on behaviour; in fact relevant information, by definition, may make a contribution in the decision-making of users.

There are no strict outlines regarding faithful representation i.e. there are no requirements of accuracy in all aspects. Free from errors, however implicates that no errors or omissions will occur in the depiction of the economic occurrence. Moreover no errors are permitted in the process used in the production of the reported information in terms of selection or application.

Understandability – an enhancing qualitative characteristic

The economic reality of an entity is not always easy to understand but complex and ambiguous. Excluding some of the information regarding a specific occurrence from financial reports would perhaps make the information easier to interpret but leave them incomplete and potentially deceptive. To classify, characterise and present the information in a clear and concise way makes the information understandable to its users.

Users are, however, thought of as having a general knowledge of business and economic activities and the financial reports are prepared for those who are capable of analysing the given information properly. Despite that, even an educated user may occasionally need to seek advice in order to fully understand the information regarding certain complicated economic situations.

Financial instruments

There are three different standards regarding financial instruments issued by the IASB organisation – IAS 32 – Financial Instruments: Presentation, IAS 39 – Financial Instruments: Recognition and Measurement and IFRS 7 – Financial Instrument: Disclosure.

A fourth standard – IFRS 9 - Financial Instruments – are under development, which will become effective in 2013 and in time replace IAS 39.

Since the regulation regarding financial instruments is divided amongst several standards all of the existing standards will be applicable for us. We will start by defining the financial instruments and the parts that it is composed of. Thereafter we will introduce the amendments to IFRS 7 that became effective in 2009 and on which this essay is partly built.

Definition

The definition of financial instruments is located in IAS 32 (p.11) '*as any contract that gives rise to a financial asset of one entity and a financial liability or equity instrument in another entity*'.

In order to get the most out of the definition it is significant to clarify the implication of financial asset, financial liability and equity instrument.

As stated in the same section as above, a *financial asset* is any form of asset that is:

- *cash*
- *an equity instrument of another entity*
- *a contractual right*
 - o *to receive cash or another financial asset from another entity; or*
 - o *to exchange financial assets or financial liabilities with another entity under conditions that are potentially favourable to the entity; or*
- *a contract that will or may be settled in the entity's own equity instruments and is:*

- *a non-derivative for which the entity is or may be obliged to receive a variable number of the entity's own equity instruments*
- *a derivative that will or may be settled other than by the exchange of a fixed amount of cash or another financial asset for a fixed number of the entity's own equity instruments. For this purpose the entity's own equity instruments do not include instruments that are themselves contracts for the future receipt or delivery of the entity's own equity instruments*
- *puttable instruments classified as equity or certain liabilities arising on liquidation classified by IAS 32 as equity instruments.*

A financial liability is any liability that is

- *a contractual obligation:*
 - *to deliver cash or another financial asset to another entity; or*
 - *to exchange financial assets or financial liabilities with another entity under conditions that are potentially unfavourable to the entity; or*
- *a contract that will or may be settled in the entity's own equity instruments and is*
 - *a non-derivative for which the entity is or may be obliged to deliver a variable number of the entity's own equity instruments or*
 - *a derivative that will or may be settled other than by the exchange of a fixed amount of cash or another financial asset for a fixed number of the entity's own equity instruments. For this purpose the entity's own equity instruments do not include: instruments that are themselves contracts for the future receipt or delivery of the entity's own equity instruments; puttable instruments classified as equity or certain liabilities arising on liquidation classified by IAS 32 as equity instruments.*

An *equity instrument* is any contract that evidences a residual interest in the asset of an entity after deducting all of its liabilities.

Examples commonly used for financial instruments include bonds, trade accounts, notes and loans (IAS 32 Application Guidance [AG] p.4). These instruments can be explained as a contractual right to receive cash in the future that is matched by another entity's financial liability representing a contractual obligation to deliver cash in the future — or vice versa.

Amendments to IFRS 7 in 2009

IFRS 7 itself is not a particularly old standard but in the wave of the recent financial crisis a growing number of users, investors and policymakers requested improvements in measuring and in the disclosure regarding fair value of financial instruments. The IASB agreed upon the need for improvements regarding disclosures in order to give the users adequate information regarding valuations, methods and the insecurity surrounding fair value of certain financial instruments (IFRS.org; Improving Disclosures about Financial Instruments (Amendments to IFRS 7 Financial Instruments: Disclosures)).

In relation to the financial crisis the IFRS 7 was amended to be effective on January 1, 2009 and entities were to use them for annual periods beginning on or after the same date. In addition to the financial crisis the amendments also addressed the conclusions made by The Group of Twenty (G20) regarding increased transparency and improved accounting guidance (G20, Washington, Nov 2008). These adjustments were made to increase the reliability of disclosures on fair value measurements and are intended to enhance the principles regarding disclosures on liquidity risk of financial instruments.

The connection to the liquidity risk is made in order to be ascertained that users of the financial reports are able to use the information in order to acquire an appropriate opinion concerning the nature and the extent of the liquidity risk of financial instruments and how a corporation deals with such a risk.

In the amendment of IFRS 7 a three-level hierarchy is implemented in order to classify the measurement at fair value. By doing so, the three-level hierarchy objective is to reflect the input used for measuring the fair value and its significance.

The three-level hierarchy is as follows (IFRS 7 p. 27A):

- *Quoted prices (unadjusted) in active markets for identical assets or liabilities. [Level 1]*
- *Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices). [Level 2]*
- *Inputs for the asset or liability that are not based on observable market data (unobservable inputs). [Level 3]*

The different levels, which were created in order to enhance the reliance in the accounting, aim to generate comparability between corporations concerning the effect of fair value. The level in the hierarchy at which classification of measurement at fair value are made is governed by the lowest level of significance of the input used in the measurement.

Suppose a measurement of observable input required a significant adjustment based on a non-observable input. In that case the measurement would be classified as a measurement at fair value in Level 3.

Fair Value Measurement

As stated in IAS 32 (p.11) fair value is the amount for which an asset could be exchanged or a liability settled, between knowledgeable, willing parties in an arm's length transaction.

When an entity establishes the fair value of an instrument the presumption is that the entity will continue its operation (is a going concern) i.e. that the value does not derive from involuntary sale, liquidation or from distraint (IAS 39 AG69).

In accordance with IFRS 7 (p.27) an entity shall disclose the methods used, and when a valuation technique is used, the assumptions applied in establishing the fair value of the instrument or the underlying financial asset or liability.

Quoted prices in an active market are the premium indicators of fair value and entities ought to use them to measure the financial asset or liability, when possible. For a price to be considered as quoted in an active market, IAS 39 AG71, set two criterions. First, the prices need to be made available from a market participant such as an Exchange, a broker, a regulatory agency or from similar organisations. Secondly, the prices in question shall represent actual and regularly occurring market transactions on an arm's length basis.

The most suitable price for a financial asset or liability is usually their current asking or bidding price on the quoted market. If the current ask or bid price are unavailable entities shall make use of the price in the most recent transaction. This price provides the appropriate estimate of the current fair value as long as no significant changes have occurred in the economic circumstances since the transaction. If the entity has indications that the price of the last transaction does not reflect the fair

value or that the economic settings have changed since the transaction, the price is adjusted to reflect the changes. The adjustment reflects the change in fair value by referring to current prices for similar instruments (AG72).

When the market for the instrument is not active, the entity may establish fair value through different valuation techniques. If a commonly used by market participants valuation technique is available, entities should use that technique to price the instrument. In order to use that technique the entity need to provide '*reliable estimates of prices obtained in actual market transactions*' (AG74). Other valuation techniques include; recent transactions of instruments that are in essence the same and models based on discounted cash flow or option pricing.

The basis for transactions of similar instrument is, as with the active market, transactions between willingly and knowledgeable parties at arm's length, if possible.

Important for the valuation of the instrument is that the entities use, to the maximum extent, observable market data and relies to a minimum extent on entity-specific inputs. The estimated price, derived from a valuation technique, can be expected to give a realistic estimation of the instruments' fair value if it reflects the value (price) of the instrument that would be acceptable by the market and if inputs used denotes market expectations as well as measurements of the inherent risk-return factors of the instrument. The objective for using such an alternative way of establishing fair value is to determine what the price would be in an arm's length transaction, on the day of measurement.

The objective of fair value determining is to determine the price at which a transaction of an instrument, in the most beneficial market, would occur.

Adjustments, however, takes place on prices from more advantageous markets in order to mirror differences in credit risk between the traded instruments and the instrument in question, which is being valued.

Fair value vs. historical cost – discussion

A well debated accounting issue is how the assets should be valued on a bank's balance sheet; it has been widely debated whether banks ought to value the financial assets by their fair value or by the historical-cost value. When assets and liabilities are valued in accordance to the fair value measurement it will lead to an effect in gains or losses on the income statement of the company. When the assets and liabilities are recognised a higher value it could lead to more leverage because the equity position will appear to be healthier. In comparison when times are tough and assets and liabilities are recognised at a lower value it will have a negative impact on a company's equity position. When the market began to fall in a fair value measurement perspective, the low equity ratio combined with large amounts of write-downs severely damages a bank's equity position, which could affect the possibility to remain in business. Whether an asset is written down or not depends on different factors such as the type of asset and if it is considered to be a temporary change of the value.

The alternative to fair value measurement is historical-cost accounting, where the assets are recorded at the price at which they were originally purchased, which is equal to the fair value at that time (Laux and Leuz, 2010).

Barth et al. (1995) analyse the difference between fair value measurement and historical-cost accounting on a valuation basis of a bank's financial instruments. In their research they recognised that banks' earnings power became more volatile under fair value measurement. They also concluded that banks more often infringed on the regulatory requirements when they valued their assets by fair value measurement.

Khurana and Kim (2003) found, in research based on Bank Holding Companies (BHCs) in the US during the period of 1995-98, no discernable differences between the association of historical cost of financial instruments with equity values and their fair value, in regard to the whole sample of BHCs. That is, neither of the two measurements is more explanatory than the other.

Regarding small BHCs and those with less transparent information environment however, they found historical cost to be more informative than valuation based on fair value. They came to the conclusion that it was the historical cost of loans and deposits that was driving this result because they are not so actively traded in well-established markets as investment securities. Thus there is more subjectivity involved in identifying the methods and in making assumptions regarding these instruments. In contrast for instruments that are more actively traded in well-established markets, such as available for sale securities, fair value explains equity values better than historical cost. Since many instruments appearing on a BHCs balance sheet are not traded in established markets it could be problematic to obtain a reliable fair value measurement.

They concluded that these results, taken together, give evidence to the notion that fair value, if objective external fair value measures are available, is more value relevant and vice versa. This is consistent with the perception that fair value is less informative for firms with lower ability to generate reliable information and for firms with less transparent information environment.

Barth (1994) points out that the measures of historical cost can be built on information that is internally available without any reference to outside market data. Fair value, on the other hand, is established through current prices or estimations, which can lead to reliability issues. For certain financial instruments that is, for instance, not traded on a well-established market or actively traded at all, fair values must be estimated. In the event of estimation error, this could harm the value-relevance of the fair value. Barth emphasises that it is the possibility of reduced reliability of fair value estimates in comparison to historical cost that most critics are concerned with.

Rating

Rating institutions

Rating institutions are specialised in rating the creditworthiness of corporations and countries. The leading credit institutions are Standard & Poor's, Moody's and Fitch's rating. The history of the rating institutions goes back to the railroad investments around the beginning of the 20th century. The institutions have quite similar rating methods and the ratings basically differ from triple A to D depending on which agency. The best rating a company can get is the triple A rating (Aaa), it means that a company has excellent prospects and a very low credit risk. As a supplement to each character letter, the rating may be followed by a digit (1-3), in which the digit represents a different level of the rating. Many investors rely on the credit ratings made by the rating institutions and a good rating often leads to lower borrowing costs. In our research we are going to look at the ratings from Moody's. The box gives a short explanation of the letters in which Moody's defines the credit risk.

The decision of using Moody's is based on the availability of ratings for both countries and banks implied with information related to each rating multiple.

Moody's Credit Risk Rating							
Grade	Aaa	Aa	A	Baa	Ba	B	Caa
Description	Minimal	Very low	Low	Moderate	Substantial	High	Very High

Fig. 3.1 – Overall summary.

Sovereign debt rating

In our statistical research we use Moody's sovereign debt rating as a control variable. The rating methodology is based upon several factors regarding each country, which differ from the corporate rating.

The two main factors in the rating scales are economic resiliency and financial robustness. The economic resiliency is determined by GDP per capita and the institutional strength of the country. Financial strength is determined by two factors. The first one is the financial strength of the government, which basically determines the government's ability to mobilize resources such as, raising taxes, cut spending and sell assets. The second factor is the susceptibility risk, which determines if the debt situation will be worsened by economic, financial or political events (Moody's, Sovereign bond ratings, Sept. 2008).

The sovereign debt rating index as a whole has eighteen different grades (Aaa-C), however, the grades related to the countries in this study is only subject to seven of them (Aaa-Ba1). The rating used in the study is the rating available on the last day of trade for 2009 and 2010 respectively. All of the countries in our research are rated for the year 2009 as investment grade and for the year 2010 Greece is rated as speculative. Figure 3.2 depicts the different sovereign debt grades used in the study.

Moody's Sovereign Debt rating	
Grade	Description
Aaa	The country has a very high economic resiliency and a very high financial robustness
Aa1	The country has a very high economic resiliency and very high to high financial robustness
Aa2	The country has a very high to high economic resiliency and the financial robustness could differ from very high to moderate
A1	The country has an economic resiliency, which differs from very high with a maximum moderate financial robustness, to a moderate economic resiliency with a very high financial strength.
A2	The country has an economic resiliency which differs from very high with a maximum financial robustness at a low level to a moderate economic resiliency with a very high financial strength
Baa1	The country has an economic resiliency which differs from high with a maximum financial robustness at a low to a very low level, to a low economic resiliency with a very high financial robustness
Ba1	The country has an economic resiliency, which differs from moderate with a maximum financial robustness at moderate to low, to a very low economic resiliency with a very high financial robustness.

Fig. 3.2 – Moody's Sovereign debt rating.

In order to the rating variable to be useful in the statistical approach we change the characters into dummy variables according to the following order.

Dummy variables							
Name	Aaa	Aa1	Aa2	A1	A2	Baa1	Ba1
Dummy	1	2	3	4	5	6	7

Fig. 3.3 – Dummy variables for Rating.

Credit Default Swaps

A Credit default swap is a bilateral agreement in order to shift credit risk between two parties. It is similar to an insurance agreement, where the buyer pays a fee to another party in return for compensation if a specific credit event or a default should occur (www.isdacdcmarketplace.com).

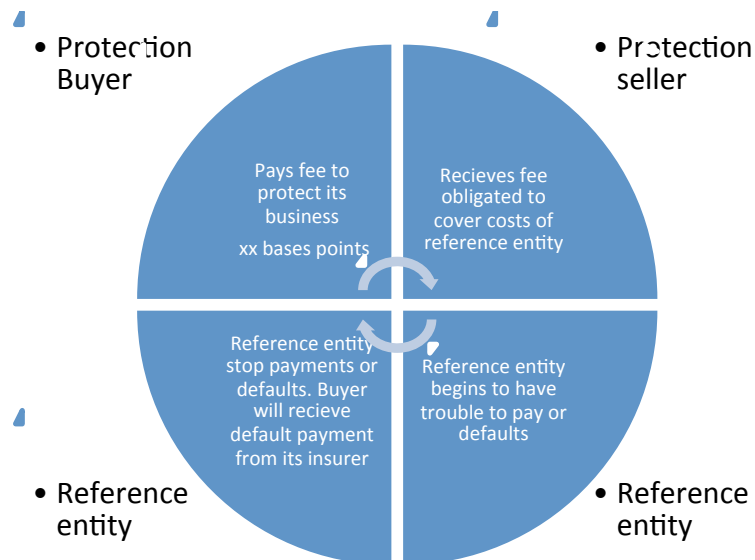


Fig. 3.4 – CDS transaction.

The picture above describes the swap transactions where the buyer pays a fee per annum to the protection seller and if the reference entity (a company or a government where the protection is written) should fail to pay or declare for bankruptcy the protection seller will have to pay the buyer the nominal amount. When gathering the information, the price of the CDSs is shown in basis points, which we then transfer into per cent.

Credit Default Swaps are mostly used in the following industries, utilities, commodities and the banking sector. Many large entities across the globe use CDS's to hedge their business from financial risks. Due to the changes in accounting principles from historical value accounting to fair value accounting, the activity in the CDS market has risen. Under fair value measurement price fluctuations has to be recognised and using the CDS a corporation can smooth out the fluctuations as the CDS will move in the opposite direction (Mason, 2009).

When measuring the price of each CDS we are looking at senior debt since it is the first prioritised debt. In the case of bankruptcy those with senior debt has to be repaid first before other debt holders.

CDS prices

The results between 2009 and 2010 differ significantly. As stated in the boxes below the difference between banks with a high cost of capital and low cost of capital is not particularly high for 2009 but it is very high for 2010. There are several events that have taken place over past two years that have incurred to the changes in the CDS prices. The most obvious reason may be the volatility in the financial market related to the recent financial crisis. Moreover our opinion is that the financial

markets are a discounting mechanism that takes different aspects into considerations over different periods which also strengthens our view to use different control variables to test for a correlation.

CDS prices - Descriptive summary (%)			
	Lowest	Mean	Highest
2009	0.546	1.455	4.332
2010	0.558	3.657	15.189

Fig. 3.5 – Overall summary CDS prices

2009

There are many banks with prices on their CDS that we consider to be low within the range between 0.5 - 0.7%. In particular we have noted that for 2009 the banks with the lowest cost of capital are two Swedish banks and a number of Italian banks. The banks with the highest cost of capital during 2009 are the Greek banks. On an average basis between the countries with the lowest respectively the highest CDS costs for its banks we have the following results (fig.3.6).

CDS prices - Descriptive 2009 (%)			
	Lowest	Mean	Highest
Italy	0.575	0.730	0.956
Greece	3.098	3.490	4.332

Fig. 3.6 – 2009 descriptive

2010

For the year 2010 the CDS prices have been rising significantly. We have noted when calculating our averages that the Swedish four banks included in our test have a lower average for 2010 than for 2009. There are particularly two Swedish banks that have a lower price on their CDS's. The same country has the highest average for 2010 as in 2009. However, we have also noted that the Irish banks also are at a very high average.

CDS prices - Descriptive 2010 (%)			
	Lowest	Mean	Highest
Sweden	0.558	0.789	0.912
Greece	9.779	11.438	15.189

Fig. 3.7 – 2010 descriptive

Information asymmetry

An important comprehension in this study is that of the relationship between the level of information and the cost of capital i.e. that a lower level of quality of the information leads to a higher cost of capital. This is often the case with information asymmetry, which state that the quantity, or rather the level of quality, of the information available for two interest parties differs. In trade, for instance, traders, who are less informed and recognise this, will try to hold their assets where their disadvantage at a minimum. This will drive down the price of the assets with a high degree of asymmetry resulting in an increasing cost of capital for these entities (Lambert et al, 2006)

Conventional methods of asset pricing e.g. CAPM (Capital Asset Pricing Model) assumes that the investors have homogeneous beliefs and thus do not tackle whether or in what way potential differences in the available information affects the price of the asset and the cost of capital. There are, however, models developed which include the circumstance of investors with heterogeneous information available to them — such as that by Merton in 1987 (Lambert et al, 2006).

Corporate disclosures are important for the capital markets to be able to work in an efficient way (Healy et al, 2001). Firms provide their shareholders with information through their financial reports where important aspects of the entity are included as information e.g. management discussion, financial statements, analysis and regulatory filings. A higher level of the quality of the disclosures provides the interested parties with a better quality of information, which potentially could lead to a lower cost of capital through minimising the information asymmetry.

Supporting earlier findings, Hughes et al (2007) presented evidence that a higher level of information asymmetry leads to higher cost of capital via a higher factor risk premium —holding total information constant. Lambert et al. (2006), however, came to the conclusion that, when regarding the expected return on an entity's stock price, the investor's average assessed precision of information is a key determinant. Thus giving evidence to support the conclusion that the cost of capital could be reduced with the increasing degree of information asymmetry between the investors and not, as thought by previous researchers, increase. Information added drove down the cost of capital but not the information asymmetry itself. In regard to this, they found that several of the factors that are thought of as having a reducing effect on information asymmetry, also have an increasing effect on the investors (average) assessed precision of information. They emphasise, however, that there are differences between the model with information asymmetry and model based on perfect competition — on which most other models are based upon.

The variety of information could become a problem for investors and other interested parties. For instance Arkelof (1970) regards in his paper "Markets for Lemons" a situation where half of the business ideas are good and the other half are bad. Since the entrepreneur will act rational and promote his business as good as possible in any occasion even if it is "bad". Arkelof argues that this will lead to a situation where both good and bad ideas are valued at an average level. If this thesis is correct it could be an incentive for companies to increase their information to their shareholders in an attempt to lower their cost of capital. Investors normally require a higher return in the case of lower informative disclosures (Healy et al. 2001). Botosan (1997) show that a firm with improved disclosures has a lower cost of capital and are normally followed by more analysts.

Accounting standards used regulate the manager's availability on how to report when the entity present their financial information. The auditors provide an independent assurance to the interested

parties that the financial statements follow the accounting standards, which from our point of view increase the quality of the information included in the annual report.

The demand for information in order to shut the gap on information asymmetry has led to an increasing sale of private information from financial intermediaries such as rating institutions and other financial analysts (Healy et al. 2001). These agencies specialise in the uncovering of the managers' superior information and releasing them to the market in terms that can be comprehended (and compared with other entities) by the market. Healy et al. (2001) points out, however, that research done on the area do not address the question of credibility since the knowledge of the intermediaries incentives are somewhat limited.

As Lambert et al (2006), Armstrong et al (2010) study the effect by information asymmetry in situations that is all but perfectly competitive. They argue that when the investor price curve slope upward, the investors that are well informed are likely to have steeper slopes than those who are not as informed. In perfect competition, however, the asymmetry of information has no separate effect on the cost of capital. Through their research they can establish the relationship between the cost of capital and the degree of market competition as negative i.e. that when the degree of market competition is low, the cost of capital is high. A possible contribution to the high information may be, according to the authors, that the companies may choose the higher information asymmetry due to the cost of reducing them. This implicates that the benefits of reducing the cost of capital are exceeded by the cost of reducing the information asymmetry.

4. Empirics

2009

As displayed in the scatter plot (fig. 4.1) there are multiple values that stands out from the rest of the observations, called outliers. Outliers are observations that have unusually large or small values, in comparison with the rest of the data set (Anderson et al, 2007). These should be detected and dealt with due to the potential effect they may have to the survey. Depending on what makes the value an outlier, the observation should be dealt with in the appropriate way.

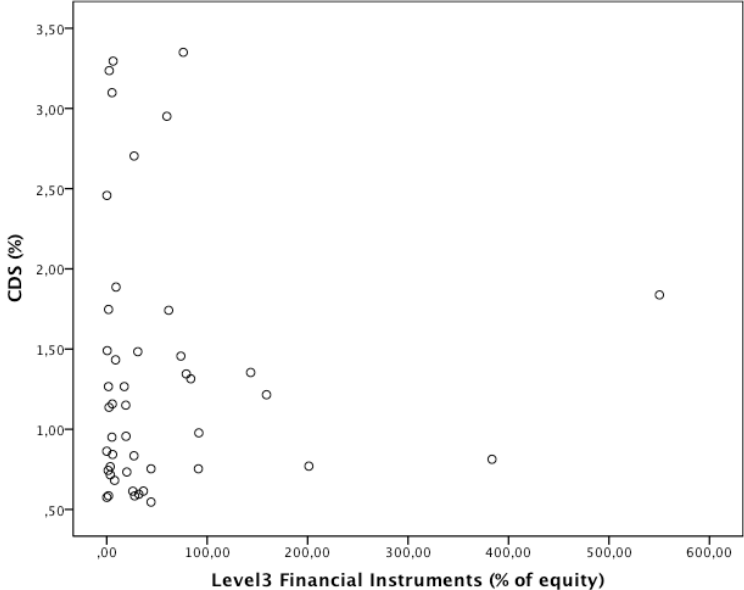


Fig. 4.1 – Scatter plot with the complete set of observations

There may be different reasons to why an outlier may appear in the recorded data. The outlier may be data that has been incorrectly recorded and as such the specific observation ought to be reviewed and corrected before going further with the analysis. It may also be from an observation that was included when it should not have been, in which case it may be removed. There is, however, the probability that the data value derives from observations that has been correctly recorded and that belongs in the set, to which it should remain (Anderson et al, 2007).

We have found no evidence that the outliers derive from incorrectly recorded observations. However, since they are outliers we do not want them to remain due to the effect they may have on the rest of the data.

Descriptive				
	Lowest Value	Median	Mean	Highest Value
CDS	0.546	1.150	1.345	3.350
Level 3 Instruments	0.000	18.990	34.787	201.188

Fig. 4.2 – Descriptive for the year 2009.

The deviation between the mean and the median in each of the two variables give an indication that the set of observations is not normally distributed but that the values are askew around its median. The implication of a mean above the median is that the distribution of observations is more consolidated above the median than below. This concludes that we cannot, with the use of standard deviation, determine which of the observations that should be eliminated — as would be if the set of data were normally distributed.

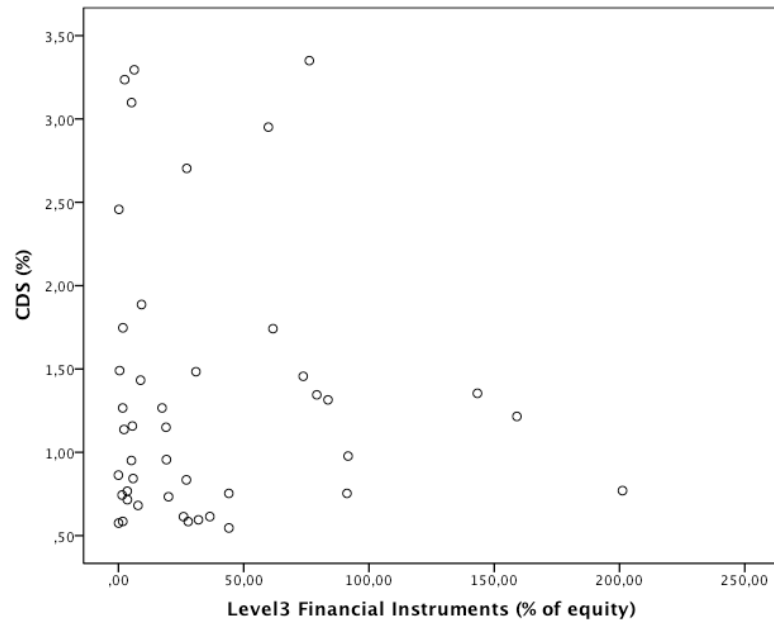


Fig. 4.3 - The set of observations that is included in the study, displayed in a scatter plot.

Simple Regression Analysis

With simple linear regression we measure the relationship between the two variables, the dependent variable (CDS) and the independent variable (Level 3 instruments) using the regression equation: $CDS = \beta_0 + \beta_1 * Level\ 3 + \epsilon$.

Three main factors important to the test are the results of the adjusted R^2 , the F test statistic and if the test are statistical significant. These statistics show the overall implication of the variables involved, in which the value of the adjusted R^2 indicates no real relationship between the model and the variance of the observations. Only 2.2% of the variability in the price of CDS can be explained using the Level 3 financial instruments based on the values of 2009.

Model summary		
Adjusted R^2	F test	Significance
-0.022	0.081	0.777

Fig. 4.4 – Simple regression summary

With a corresponding p-value⁴ of 0.777 the F test show no statistical significance and hence indicates that there are other factors than the Level 3 financial instruments that have a substantial impact on the explanation in the movement of CDS prices.

Hence, we can conclude that a high grade of Level 3 instruments is not an appropriate variable to measure the cost of capital.

⁴ Using a 95% confidence level.

Multiple Regression Analysis

We came, in the simple regression analysis, to the conclusion that we could not determine a significant relationship between the two variables. With the multiple regression analysis we assess the relationship between the dependent variable (price of CDS) and a variety of independent variables. This is done to control for any elements that may be more influential than the amount of Level 3 financial instruments in explaining the dependent variable (Gaur and Gaur, 2009).

The multiple regression model expressed by the comprised variables:

$$\text{CDS} = \beta_0 + \beta_1 * \text{Level 3} + \beta_2 * \text{Rating} + \beta_3 * \text{Size} + \beta_4 * \text{Debt-to-Equity} + \beta_5 * \text{ROE} + \beta_6 * \text{Tier 1 ratio} + \epsilon.$$

As stated earlier, the independent variable includes Level 3 financial instruments, Rating, Size, Return on Equity, Debt-to-Equity and Tier 1 ratio — with the latter five as control variables. As displayed in the model summary, the value of the adjusted R^2 indicates that 14.7% of the variance in the movement of the price of CDS can be explained by the independent variables in the model.

Model summary		
Adjusted R2	F test	Significance
0.147	2.180	0.069

Fig. 4.5 – Multiple regression summary

The adjusted R^2 of the multiple regression equation gives a value of 14.7%, which is higher than the value of 2.2% for the simple regression analysis. The use of the adjusted R^2 ensure avoiding any inflation the impact that adding an additional independent variable has on the amount of variability explained by the regression model (Anderson et al, 2007).

The value indicates, on its own, that there are other factors that have a substantial impact on the cost of capital, via the price of CDSs.

In multiple regression analysis, a significant relationship between the dependent variable and the set of independent variables (i.e. the overall significance) can be concluded using an F test (Anderson et al. 2007).

In the study of 2009, the F statistic has a value of 2.180 with a corresponding significance⁵ of 0.069, indicating that a significant relationship between the variables cannot be determined.

⁵ Using a 95% confidence level.

Independent Variables				
	Std. Beta	t-test	Significance	Multicollinearity
Level 3	-0.082	-0.454	0.653	1.566
Rating	0.409	2.203	0.034	1.658
Size	-0.361	-2.110	0.042	1.409
Debt-to-Equity	0.222	1.259	0.216	1.492
ROE	-0.154	-0.989	0.330	1.164
Tier 1 ratio	0.260	1.466	0.151	1.515

Fig. 4.6 – Statistics of the independent variables.

Whereas the F test measures the overall significance, the t-test is used to determine the significance of each of the individual independent variables. The value of the standardised beta expresses the effect that the independent variable will have on the dependent variable, using standardised data, in the regression analysis.

As shown in the figure above, rating has the highest (absolute) value of beta and together with size, the only two variables to be significantly different from zero — at a 95% confidence level.

The independent variable is used in order to predict the dependent variable, for which the regression analysis is performed. The term, however, does not mean that the variables are independent themselves. Multicollinearity⁶ indicates a potential correlation between the different independent variables that may influence the regression model as a whole. Which size of the values that indicate a potential problem with multicollinearity may differ between the sciences (Gaur and Gaur, 2007) although our highest value of 1.6 gives no indication of a potential problem with multicollinearity.

Correlation							
Corr. (Sign.)	CDS	Level 3	Rating	Size	D / E	ROE	Tier 1
CDS	1	-0.042	0.346	-0.351	-0.013	-0.054	-0.021
Level 3	(0.395)	1	-0.395	0.091	0.399	-0.296	0.385
Rating	(0.012)	(0.005)	1	-0.368	-0.524	0.215	-0.303
Size	(0.011)	(0.284)	(0.008)	1	0.171	-0.110	0.434
D / E	(0.468)	(0.004)	(0.000)	(0.140)	1	-0.239	0.144
ROE	(0.368)	(0.028)	(0.085)	(0.244)	(0.064)	1	0.004
Tier 1	(0.449)	(0.006)	(0.026)	(0.002)	(0.182)	(0.490)	1

Fig. 4.7 - Correlation (and the corresponding significance) between the variables.

The correlation between the dependent variable and the independent variables were acquired through SPSS in order to determine the relationship. With the correlation coefficient we display the

⁶ Displayed as a value of Variance Inflation Factor (VIF).

strength of the linear relationship between the variables through values of between -1 and +1 (Anderson et. al. 2007). A +1 value denotes an absolute positive relationship (when x increases, y increases) whereas -1 represents an absolute negative relationship (when x increases, y decreases). A value of 0 indicates no linear relationship between the variables.

As figure 4.7 present, five of the variables have a negative correlation to the dependent variable (ceteris paribus) albeit only one of them (Size) is significantly different from zero. Rating is the only variable that has a positive correlation coefficient as is also significant different from zero, which makes it an estimate of the price of the CDS. Both of the two significant variables have similar values, albeit in different directions. As rating (*size*) increases with 1 unit, the price on CDS increases (*decreases*) with 0.346 (0.351) units — ceteris paribus. As such we can conclude that the sovereign debt rating and the size of the assets have an explanatory power on the price of the CDSs on each bank.

The statistics in the correlation matrix (fig. 4.7) does not reveal any particularly high values, displaying no sign of a strong intercorrelation. The Debt-to-Equity and Rating intercorrelation exhibits the highest level of significance with a corresponding correlation of -0.524, which is the strongest correlation among the variables. In general, the Rating variable displays the stronger correlations with the other variables, most of which also is significant at a high level of confidence.

2010

The observations for 2010 seem to be clustered in the lower left corner to a higher degree than the previous year. A possible explanation could be that a set of banks did not release their annual reports prior to the survey and thus not included. Another feasible conclusion is that the banks have had a chance to adjust to the implications of the recent economic crisis.

As with the result for the 2009 test, we do not obtain the results that we were expecting. A positive relationship between the variables should manifest itself on the scatter plot as a concentration of dots opposite the received concentration.

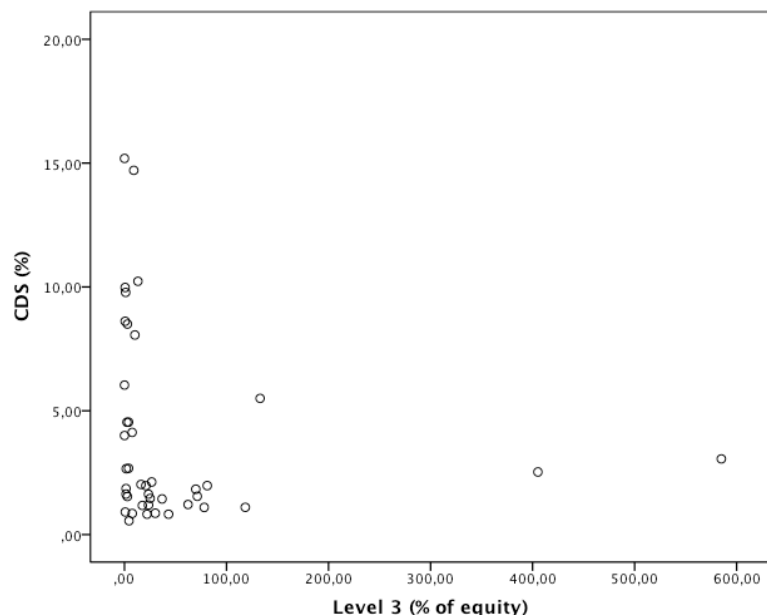


Fig. 4.8 – Scatter plot with the complete set of observations.

Several observations in the data as shown in figure 4.8 possess values that greatly differ from the others and may have an influential impact on the results and were consequently removed as outliers.

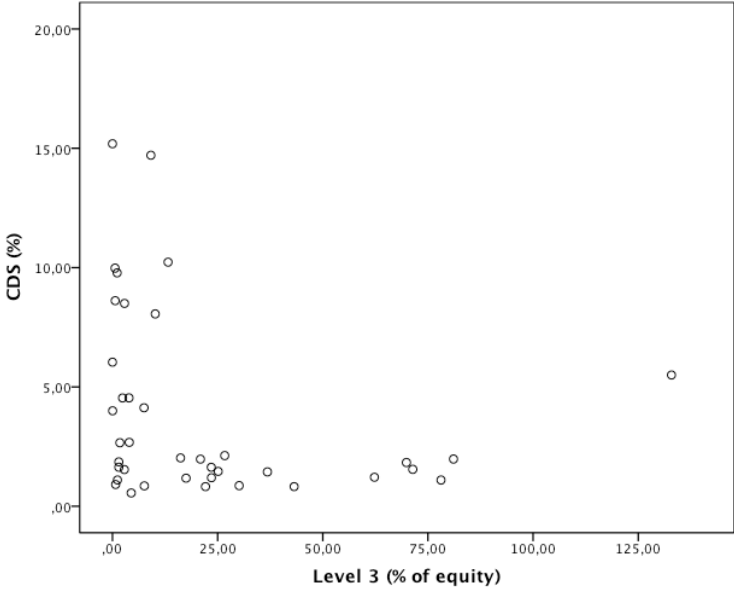


Fig. 4.9 – Scatter plot with the included observations

Descriptive				
	Lowest Value	Median	Mean	Highest Value
CDS	0.558	1.974	3.867	15.190
Level 3 Instruments	0.000	9.129	22.007	132.90

Fig. 4.10 – descriptive for the year 2010

Simple regression analysis

The results from the 2010 test show no statistical significance regarding the overall fit of the regression model. This result concurs with the results of the 2009 test and opposes our initial belief.

The implication of the result is that the Level 3 instruments do not constitute a viable measurement for the cost of capital regardless of which of the years we examine. The F test statistic and its corresponding critical p-value indicate, however, that the model would be a better fit than the 2009 model.

Model summary		
Adjusted R2	F test	Significance
0.042	2.658	0.112

Fig. 4.11 – Model summary of 2010

Multiple Regression Analysis

Unlike the result on the multiple regression analysis made for 2009, the 2010 test gave an overall significance⁷. This indicated that the independent variables are significantly different from zero and can be used in order to estimate the cost of capital via the price of a banks CDS. This was not, however, the result from the simple regression equation made on the figures of 2010, which indicate that the added independent variables have a significantly higher explanatory power combined compared with the single Level 3 variable.

The adjusted R² amounts to 0.858 indicating a high explanatory power, by 85.8%, in the variability of an entity's cost of capital (via the price of the CDS) by the independent variables. Together with the F test statistic and its relating value of significance, the overall model of regression has a good fit and a viable variable on estimating the cost of capital. A significant relationship can thus be determined.

Model summary		
Adjusted R2	F test	Significance
0.858	38.243	0.000

Fig. 4.12 – Model summary 2010

We use the t-test in order to get a closer look at which of the variables that has the greater impact in the model and which of them that do not.

Independent Variables				
	Std. Beta	t-test	Significance	Multicollinearity
Level 3	0.071	1.063	0.296	1.154
Rating	0.856	11.227	0.000	1.514
Size	-0.072	-0.998	0.326	1.363
Debt-to-Equity	0.008	0.103	0.918	1.386
ROE	-0.193	-2.639	0.013	1.399
Tier 1 ratio	-0.066	-0.899	0.376	1.419

Fig. 4.13 – Statistics of the independent variables.

The t-test present the relationship between the dependent variable and each of the independent variables separate i.e. ceteris paribus. As shown in figure 4.13, both Rating and Return on Equity show a significant relationship with the price on CDSs (at a 95% confidence level). Rating is the only variable to be significantly different from zero in both 2009 and 2010, which we find to be a positive remark. The financial environment may thus play a substantial part in the pricing of CDSs, particularly when the adding the correlation between the dependent variable and the rating variable (ceteris

⁷ Using the same regression equation in 2010 as in 2009.

paribus). As figure 4.14 displays, the correlation between the aforementioned variables are rather high (0.908) indicating that when the rating variable changes with one unit, the variable depicting the price of a CDS moves with 0.908 units.

The variance inflation factor gives no indication on a possible problem with multicollinearity, since neither of the values exceeds 1.6.

Correlation							
Corr. (Sign.)	CDS	Level 3	Rating	Size	D / E	ROE	Tier 1
CDS	1	-0.251	0.908	-0.449	-0.176	-0.303	-0.480
Level 3	(0.064)	1	-0.332	0.254	0.181	0.038	0.192
Rating	(0.000)	(0.021)	1	-0.444	-0.289	-0.101	-0.388
Size	(0.002)	(0.062)	(0.003)	1	0.302	-0.017	0.301
D / E	(0.145)	(0.138)	(0.039)	(0.033)	1	-0.372	-0.005
ROE	(0.032)	(0.410)	(0.274)	(0.460)	(0.011)	1	0.376
Tier 1	(0.001)	(0.124)	(0.008)	(0.033)	(0.487)	(0.010)	1

Fig. 4.14 – Correlation (and the corresponding significance) between the variables.

Four of the control variables are significantly different from zero, regarding their correlation with the dependent variable. Excluding the before mentioned variable of rating, which has a substantial positive correlation, the variables tend to have a negative relation to the dependent variable. The values of the correlation are not strong enough to be of a perfectly positive correlation⁸, but not small enough to be discharged as insignificant.

As shown in figure 4.14, the intercorrelation of the variables is not particularly strong. However, three of the control variables display a stronger correlation in general than the rest. These three variables (Rating, Size and Tier 1) also exhibit a larger amount of significant relationships with the other variables. The strongest correlation between two variables, other than with the dependent variable, exhibits Rating and Size. Their intercorrelation measures -0.444 and displays significance at a 95% confidence level. This correlation exhibits the highest significance among the variables (excluding that of CDS and Rating).

As oppose from the 2009 test, the Level 3 instruments show no significant⁹ correlation with another variable except the Rating variable.

⁸ As described in the 2009 segment on multiple regression.

⁹ At a 95% confidence level.

5. Analysis

Simple linear regression

Firstly, we do not have any significance in our simple linear equation for 2009 or 2010. It is therefore difficult to make any general assumptions in this matter. We have however analysed the results and have come to the following conclusions.

At a 95% confidence level, we find no relationship between the Level 3 financial instruments and the cost of capital. We can however conclude that there are other factors of higher importance to the banks cost of capital when measured by their CDS than the Level 3 instruments. There do not seem to be any particular problems of having large amounts of financial instruments at the moment, which is valued using unobservable inputs.

When measuring the Level 3 instruments in regard to the total asset it represents a very low proportion of the assets, in average below 3%. This could be a factor to take into consideration in regard to the low correlation.

Nevertheless, we thought that the significant amounts of Level 3 instruments in regard to equity that many banks had would have had a bigger impact on the banks' cost of capital. For example a severe write-down in regard to the banks' low equity position can give them a negative equity position.

Multiple linear regression

Using the following multiple regression equation, we test the parameters which we consider to be important aspects of a banks' business.

$$\text{CDS} = \beta_0 + \beta_1 * \text{Level 3} + \beta_2 * \text{Rating} + \beta_3 * \text{Size} + \beta_4 * \text{Debt-to-Equity} + \beta_5 * \text{ROE} + \beta_6 * \text{Tier 1 ratio} + \epsilon$$

The adjusted R^2 value in 2009 test is very low and the test does not indicate any significance at 95% confidence level. Therefore we can conclude that the metrics we have used in order to get a better understanding of the relation to the cost of capital of a bank is not statistically connected to the banks' cost of capital. We have however two significant variables: Size and Rating which also has a higher beta value. Since the multiple regression analysis for 2009 did not show any significance (at a 95% confidence level) we have decided not to analyse them further.

The multiple regression analysis for 2010 has a high adjusted R^2 value at 0.858 and the test is significant. Therefore we can conclude that our variables are related to the cost of capital of a bank. When taking all the data into consideration in the formula, Rating has the highest significance and the highest beta value, which means that it is closely related to the cost of capital. Another significant variable is Return on Equity, it has a negative beta value of -0.193. This means that the movement in return on equity is around 20% of the movement of the CDS price in a negative direction.

In the multiple regression analysis it is clear that the operational environment is the single most important factor when pricing the CDS of a bank in 2010.

Correlation

We have also tested the correlation between each of the control variables and the dependent variable in order to get a better understanding in the relationship to the price of CDS. The multiple regression beta values are different from the correlation values. The results do also differ significantly between 2009 and 2010.

The variables show a significant higher correlation with the price of the CDS in 2010 than in the 2009 test. In the 2009 test there are two variables we see a correlation to the CDS and that is the total assets and the sovereign debt rating. For 2010 we have more variables correlated to the CDS price, the following are; Sovereign debt-rating, Total assets, Tier 1 ratio and Return on Equity. A possible explanation to the stronger correlation in 2010 observations is that the average in many variables has increased.

The variable with the highest correlation to the price of the CDS is the sovereign debt rating (Rating) which increased between the years from 0.346 to 0.908. The 2010 correlation of 0.908 depicts an almost perfect positive correlation between the rating and the dependent variable. This indicates that rating is an important factor albeit cause may be raised to argue the difficulties to make any conclusions based on a two-year survey. During the two years there are different events, which probably have caused the rising correlation between the years. The most important factor we can conclude is that a couple of countries have been downgraded and banks' from these countries also have rising CDS prices. When analysing the values of the rating variable in relation to the dependent variable we see a higher concentration of observations manifesting as clusters.

Size is the second variable that is significant in both 2009 and 2010 when analysing the correlation in a simple linear regression analysis. The correlation in 2009 is -0.351 and in 2010 it is slightly stronger at -0.449. The negative correlation explains that a higher X-value referred to as bigger bank has a lower cost of capital. We do see increasing values between the years, however the test indicates that size seem to be a more stable factor which do not differ significantly over the years. By referring to former crises such as the Mexico crisis of 1994 and the results of Yácamán (2001), many small entities are often merged into larger banks. The recent crisis of 2008 were no exception and portion of the smaller banks were declared bankrupt or merged with larger banks. The large banks have in various occasions received aid and huge amounts of capital from the central banks.

We have measured the banks financial strength by using the Tier 1 ratio. In our tests the variable is only significant in the 2010 test. In our 2010 test it is negatively correlated at -0.480 i.e. that banks' with a low Tier 1 ratio have high CDS prices and vice versa. Notably a majority of the banks have a Tier 1 ratio above the target of 8%. The majority of the banks have a Tier 1 ratio in the range from 8-11%. When analysing the results further we detected banks with an influential behaviour. There are two banks with a significantly higher Tier 1 ratio than the average, they have a ratio of 14% respectively 16.5% both of these banks CDS prices are well below the average for 2010. Contrary to the high ratios we have one Irish bank with a high CDS price and a ratio at 4.3%.

By using our five-year Return on Equity to measure the correlation between profitability and the cost of capital we found no significance for the year 2009. The 2010 test is significant and the variable is negatively correlated to the cost of capital at -0.303. The negative correlation of -0.303 means a higher ROE results in a lower cost of capital. A majority of the banks in our test have a positive ROE

over the years. In 2010 we have detected one particular extreme value, which has a negative average ROE in 2010, and a high cost of capital.

Overall market and Banks

When analysing the development in CDS prices from 2009 to 2010 we see four countries in particular with rising prices PIGS10. Italy is excluded from the original PIIGS countries. After going through the development of each bank of each of these countries we can conclude that the bigger Spanish banks' with a high international exposure is excluded from high increases in their CDS prices. The smaller Spanish banks with a high national exposure experience significantly higher CDS prices. The results indicate that size and operational environment are leading indicators when pricing the Spanish banks. Portugal is another country with rising CDS prices, they also have higher prices on their CDS's than the Spanish banks and the smallest entity has a bit higher CDS price among the group of Portuguese banks'. The CDS prices in particular on Greek and Irish banks are very high. Ireland and Greece have the lowest sovereign debt ratings among the countries in our tests. However, we have noted that Irish banks score low on our financial strength tests. The Greek banks do not score particular low on any of our other tests except for the operational environment. Notably, Greek banks have high amounts of Greek bonds on their balance sheets. This could be another factor for the higher CDS prices. When looking at the debt to GDP and the budget deficits in Greece and Ireland, we do not think that it would be an appropriate solution for these countries to socialise more private debt. After analysing our variables it seems that the Irish banks in particular are in need of a capital infusion. If the Irish government would socialise more debt in order to strengthen their banks their debt to GDP will increase further and it could lead to more implications to the overall economy even more difficulties for the country to borrow money.

Having in mind the following problems such as, the sovereign debt, rising unemployment, shrinking wages and a high supply of houses in many countries where banks in our survey are located. Greece and Ireland might not be the only countries in our survey where banks can have problems. Therefore concerns may be raised in regard to the following posts securitized debt, collateralised debt obligations and derivatives that is also included in Level 3 instruments. This type of posts often includes large amounts of mortgage loans and car loans. If the banks client base continues to struggle there could be problems in these areas.

Many banks in our survey are highly leveraged. We believe that the bailout of Long Term Capital Management in the USA is a starting point as well for the European banking sectors highly leveraged balance sheets. They managed their operations with a very high leverage 3 billion in equity and then managed to leverage its business up to 1.25 trillion. After considering what kind of balance sheet problems we have had and the excessive debt particularly on the balance sheets of banks in our view, it seems to have signalled to the market that a higher risk level is acceptable. The banks began to leverage up after this crisis instead of leverage down.

Notably for this crisis a private company's problem has become a problem for a whole nation and a region as a whole. The policies in relation to the current economic crisis has led to transferring of large amounts of debt from private to public and many banks have been bailed out. Another aspect to the large budget deficits is that many countries we are following have economic stabilisers such as unemployment benefits and educating benefits that increasingly worsen the budget deficit when

¹⁰ Portugal, Ireland, Greece and Spain

unemployment is rising. Therefore the budget deficits grow rapidly when a country experiences tougher economic periods. In relation to the bailouts and the stimulus that have taken place, the budget deficits are still in many countries very high and the debt to GDP have been rising dramatically. It is a possibility that policies taken during the crisis may have a negative impact on the future economic development of the European banking sector and the European Union as a whole.

The result of our survey is that the market as a discounting mechanism focuses on different aspects. Based on the multiple regression analysis, the operational environment has been an important indicator when measuring the cost of capital for the European banking sector and not, as our initial belief, the Level 3 financial instruments.

6. Conclusions

The results of our study indicate that banks with a higher amount of Level 3 instrument do not have a higher cost of capital contrary to our initial beliefs. We also found indications that other factors have a greater relationship with the price of CDS, when testing for control variables.

The origin of such a result may be, in our point of view, that the Level 3 instruments constitute a very small portion of the banks' total assets, in average less than 3%. Another possible cause to the result is the volatility in the banking sector in the recent years. One conclusion is that the financial markets are a discounting mechanism that takes different aspects, over different periods of time, into consideration when pricing the CDSs. The volatility in the CDS market over the two years would make an extended test during a longer period of time of interest.

This conclusion is supported by the significance of the multivariable regression analysis, in which two of the control variables were statistically significant. The implication of such a result is that the two variables (Rating and ROE) have a greater explanatory power than the rest of the variables. Taking the correlation between the dependent and each of the independent variables into consideration, the test showed a correlation between the dependent variable and most of the control variables, *ceteris paribus*.

Even though the financial instruments, measured using unobservable inputs (Level 3 instruments), do not appear to have any explanatory power in regard to the cost of capital they may be of interest in the future. Taking the recent events, when certain banks transferred Level 1 financial assets into Level 2 and 3 (Laux and Leuz, 2010) and the development for these banks, the Level 3 financial instruments may in the future constitute an explanatory variable.

The results depict the relevance of the Level 3 instruments in regard to the cost of capital for European banks and as such it would be of interest to future research to include geographic areas such as the North America and the US in particular. As well as an expanded geographical area, it would also be of interest to increase the number of years examined since a period of two year is far to short for a sound base upon which a conclusion may be made. It would also, in our point of view, be of interest to examine any potential differences in the relation between the Level 3 instruments and the cost of capital in banks notably affected by the recent crisis and banks where not affected.

7. References

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