ERASMUS UNIVERSITY ROTTERDAM
SCHOOL OF ECONOMICS
MASTER ACCOUNTING, AUDITING AND CONTROL

Risk reporting: An analysis of the German banking industry

Master thesis Accounting, Auditing and Control

Rotterdam, July 2 2009

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Abstract

Although banks have always been risk-taking entities, the recent financial crisis resulted in an increased attention on the risks of banks and their financial instruments. This research therefore examines the disclosures of market, credit, and liquidity risks of a sample of German banks in their 2005-2008 annual reports. By constructing two disclosure index frameworks and applying these to the annual reports the quantity and quality of the risk disclosures are examined.

Since the outcomes of the empirical research show that there are differences in disclosures scores between banks, several hypotheses are developed based on among others the political cost theory and the fact that new regulation on risk disclosures (IFRS 7) has been introduced in 2007. The relationships that are examined are the following: the relationship between (1) the quantity and quality of disclosures, (2) disclosures and bank size, (3) disclosures and bank profitability, and (4) disclosures and time. Significant positive relationships are found for the relationship between the disclosures and time and the relationship between quantity and quality scores.

This research contributes to the accounting literature for several reasons, amongst others because it focuses on risk disclosures in a sector that has only been examined by a few other researchers before. Next to that, it provides a sound basis for future research like capital market research, event studies, and behavioral studies in relation to risk disclosures.

Keywords: bank, content analysis, disclosures, financial instruments, Germany, IFRS 7, quality, quantity, risk

Acknowledgments

Table of contents

Photo front page: www.topnews.in/files/Deutsche-Bank_1.jpg

Abbreviations

AFM	Authority of Financial Markets
AICPA	American Institute of Certified Public Accountants
AIMR	Association of Investment Management and Research
ASB	Accounting Standards Board
CDO	Collateralized Debt Obligations
ECB	European Central Bank
EU	European Union
FRS	Financial Reporting Standards
FTSE 100	Financial Times Stock Exchange
GAS	German Accounting Standards
GASB	German Accounting Standards Board
HGB	Handelsgesetzbuch (German Commercial Code)
IAS	International Accounting Standards
ICAEW	Institute of Chartered Accountants in England and Wales
IDW	Institut der Wirtschaftsprüfer in Deutschland
IFRS	International Financial Reporting Standards
SEC	Securities and Exchange Commission
UK	United Kingdom
US	United States
VaR	Value-at-risk

1.   Introduction

1.1.   Risk reporting

'Banks are especially unpopular in two circumstances: first, when they are very profitable; and second, when they are very unprofitable' (Sir Davies, LSE) [1]

In 2007, and even more in 2008, the world got confronted with an international financial crisis, also called the credit crisis. Worldwide banks had invested billions of Euros in financial instruments like *subprime related collateralized debt obligations (CDO's),* but due to increasing interest rates, decreasing values of houses and the consequences of that for the repayment of mortgages in the United States, the value of these and other financial instruments decreased significantly. Since International Financial Reporting Standards prescribe to impair on these financial instruments through the profit and loss account when the value declines significantly, banks had to report billions of Euros of losses. One of the industries that is hit hard by the crisis is the German banking industry, that even needed support from the government to survive. Although Sir Davies states that banks become unpopular when they are very unprofitable, research of this industry becomes however more interesting.

Since the existence of banks these are known to be major risk taking and risk management entities. Hypovereinsbank (2009, 40) even describes in their annual report that 'as a rule it is not possible to earn income in the banking business without incurring risk'. According to Linsley and Shrives (2005, 205) they are therefore "expected to release relevant risk-related information to the marketplace, as part of good corporate governance". The annual report is for many years used to communicate firm performance with shareholders and stakeholders and includes, in general, both mandatory and voluntary disclosures. Although regulation is meant to protect the stakeholders, some argue however that this will only lead to an oversupply of accounting information (Deegan and Unerman, 2006, 49).

Although some suggest that companies will disclose more bad news when their financial position is threatened (Darrough and Stoughton, 1999; Suijs, 2005), Linsley et al. (2006, 279) state that banks might wish to keep discussions about their risk levels out of the public domain. The demand for disclosures in general has however increased over the years (Cole and Jones, 2005). Major corporate scandals and the discussion about corporate governance contributed to this, and due to the financial crisis the focus on risk disclosures will only increase. Despite that the discussion about risk disclosures was already going on for several years, it took the International Accounting Standards Board however until 2005 to publish an exposure draft to come to regulation to improve the disclosures about financial instruments and their risks. From 2007 companies with financial instruments and that report in conformity with the International Financial Reporting Standards (IFRS) have to implement IFRS 7 *Financial Instruments – Disclosures.* Specific risk disclosures by banks are since 2008 also required by Basel II pillar 3, and for German banks already since 1998 by the Commercial Code and since 2001 by the

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[1] Sir Howard Davies, director of the London School of Economics in 'New banking rules: tread carefully, The Financial Times, September 30, 2008.

German Accounting Standard (GAS) 5-10. Comprehensive risk disclosures in the annual reports of German banks are therefore expected, even in the years before IFRS 7 and Basel II.

Since 2001 empirical research on disclosures and the relationship with for instance firm-specific characteristics has increased[2] (Amran et al., 2009, 39). More recently the topic of risk disclosures is also studied, mostly focusing on stock-listed, non financial firms however (e.g. Kajüter and Winkler, 2003; Linsley and Shrives, 2006; Abraham and Cox, 2007; Amran et al., 2009). Since research on financial firms is rather rare Linsley and Shrives (2006, 400) state that more empirical research is necessary, not only to examine cross-country and industry-specific factors, but also to develop an approach than can assess the quality of risk disclosures. Research methods that are used in previous research might therefore need to be adapted.

1.2.   Objectives

Since there are only a few empirical studies on risk disclosures by banks and the interest in risk disclosures has strongly increased due to the financial crisis, it is interesting to examine this topic. Both a literature study and empirical research of risk disclosures in the German banking industry will be conducted in order to increase the understanding of why risk disclosures are important and what the developments in this area are.

One of the objectives of this study is to develop new disclosure frameworks that can measure the quantity and quality of risk disclosures in the banking sector and that can overcome certain limitations of previous research. Although quantity is also assumed to be a good proxy for the quality of information in other studies, which is logical when the disclosed information is relevant for the user, the quality framework in this research also takes into account the other qualitative characteristics of the IASB framework: understandability, comparability, and reliability. The quantity framework is based on IFRS 7 and measures quantity by counting the number of pre specified items disclosed. In order to distinguish between quantity and quality, these separate frameworks will therefore be called the quantity framework and quality framework throughout the rest of this research.

The main objective of this research is to examine the developments of risk disclosures in annual reports over time and the differences between banks. Therefore the frameworks will be applied to a sample of eight German banks, resulting in disclosure scores that can be analyzed and tested for relationships with bank size, profitability, and time. Next to that, more insight will be provided into the relationship between the quantity and quality of disclosures.

1.3.   Research questions

In this research the problem is defined by the following main research question:

How can differences in the quantity and quality of financial instrument risk disclosures in the annual reports of German banks be measured and explained?

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[2] Among others due to a petition in 2001 by the four biggest accounting firms in the world to the Securities and Exchange Commission (SEC) in the United Stated with the request to provide more guidance on disclosures

Before conducting own empirical research it is important to examine the theoretical background first. To support the main research question, the following sub questions are therefore drawn up:

1. What is risk and what are risk disclosures?
2. What are financial instruments and their risks?
3. How has the concept of risk reporting developed in general, and more specifically for German banks?
4. What is the rationale behind risk reporting?
5. What other empirical research has been done about risk reporting, and more specifically risk reporting in the banking sector?
6. How can risk disclosures be measured and what are the limitations of these methods?

The empirical research focuses on the quantity and quality of information and in order to measure this, a method needs to be developed. Two frameworks are constructed for this and consequently applied to the annual reports of German banks. The following sub questions are related to the construction of the frameworks and the empirical research:

7. How can the quantity of risk disclosures of financial instruments be measured?
8. How can the quality of risk disclosures of financial instruments be measured?
9. Do banks that score high on the quantity of risk disclosures also score high on the quality of risk disclosures?
10. How can possible differences (in the quantity and quality) of risk disclosures in the annual reports of German banks be explained?
11. Have the quantity and quality of risk disclosures significantly increased over the years 2005-2008 and how can this be explained?

1.4. Research design

This research is divided in three major parts. The first part is descriptive research that consists of a literature study in which not only the background of risk disclosures is discussed, but also the institutional setting of Germany, the rationale behind risk reporting, and previous empirical research on this topic. In order to understand how studies on risk reporting can be conducted and what the limitations of the methodologies are, the concept of content analysis will be explained before the second and third part of the research will be described.

The second part of this research consists of the construction of disclosure index frameworks that will make it able to measure the quantity and quality of risk disclosures. Consequently these will be applied to the annual reports of 2005-2008 of eight German banks that are included in the sample. Differences in disclosure scores are expected and in the third part of this research these will be tried to explain by testing the relationships between disclosure scores and other variables. Pearson correlation coefficients and a paired samples t-test will be calculated in PSAW (former SPSS) and conclusions will be drawn based on these results.

1.5. Relevance

Despite that both voluntary and mandatory risk disclosures in annual reports are examined before, this research is still relevant and contributes to the accounting literature for several reasons.

First of all, this study focuses on financial institutions and in particular banks. Next to the biggest audit firms, only the Basel Committee (2001, 2002, 2003), Linsley et al. (2006) and Helbok and Wagner (2006) have until now empirically examined the risk disclosures in the annual reports of banks by using content analysis.

Second, this study is relevant because it focuses on a recent time period and incorporates as one of the first the risk disclosures as required by IFRS 7 since 2007. Studies on German non-financial listed companies and focusing on the German Auditing Standard 5 *Risk Reporting* have already been performed by Kajüter and Winkler (2003) and Fischer and Vielmeyer (2004) and show non-compliance with GAS 5 and mainly qualitative reports.

A third reason why this study is relevant and contributes to the literature is due to the fact that new frameworks have been developed that can measure the quality of risk disclosures as well as the quantity of risk disclosures. In other studies (Marston and Shrives, 1991; Zarzeski, 1996) quantity is assumed to be a proxy for quality, although others (Beretta and Bozzolan, 2004; Beattie et al., 2004) doubt this. By examining both the quantity and quality of disclosures in this research and the correlation between it, more evidence can be provided for the discussion on whether quantity can be considered to be a good proxy for the quality of information.

Finally, the most important reason why this study is relevant in the 'scientific perspective' is because it provides a sound basis for future research like capital market research, event studies and behavioral studies in relation to risk disclosures.

Next to the relevance for the scientific accounting literature, the topic is also socially relevant and interesting for users, providers, auditors and regulators that are involved with the annual reports of banks. For providers the empirical results show how they score in comparison to their competitors, and for auditors the results might be interesting since they are closely involved with the editing of the annual reports as well. Regulators can derive from this research whether the quantity and quality of financial reporting information has changed, whether increased regulation has the desirable effect, and if it might be necessary to change the existing regulation. At last, users of the annual reports of banks possibly closely follow the developments in the banking sector and have become interested in this topic. For them, the first part of this research that shortly describes the development of risk reporting and regulation in this area is probably the most interesting, next to the results of the analysis.

1.6. Demarcation and limitations

There are many different types of risk a company faces. One of these risks is financial risk, which can be divided into several subtypes as well. Considering the importance of financial instruments for banks and the increased interest in these risks, the scope of this research will be the risks of financial instruments which are market, credit and liquidity risk, with a subdivision of market risk into interest rate, currency and other price risk. Operational risk, another specific banking risk, is not taken into account; neither is business risk or other types of risk.

The banks included in the sample are selected from the database Bankscope. The corresponding annual reports are retrieved from the annual reports database of KPMG. Only the banks that

issued annual reports in English are selected and therefore not every German bank was included in the initial list for selection. Due to this and due to the limitation of time, which did not make it possible to examine every annual report, no general statements about the whole German banking sector can be made.

A major limitation of this research is subjectivity. The construction of the frameworks and the coding of the annual reports are subject to a certain degree of subjectivity. In order to overcome this, validation of the frameworks and reproducibility of the disclosures scores are important. Section 5 will elaborate on this.

1.7.   Structure

In conclusion, the main purpose of this research is to examine the risk disclosures of financial instruments in the annual reports of German banks and to analyze some factors that might be of influence on the differences in disclosures over time and between banks. In order to do this disclosure frameworks that can measure the quantity and quality of risk information are developed and applied to the 2005-2008 annual reports of eight German banks.

In order to enhance the understanding of risk reporting, section 2 will describe the background of risk reporting including a description of the concept of risk, the risks of financial instruments, the development of disclosure requirements and the institutional setting of Germany. Section 3 hereafter discusses risk disclosure literature on the rationale behind risk reporting and presents an overview of previous empirical research in this area. Risk disclosure models, thereby focusing on content analysis and the limitations of it, will be discussed in section 4. The construction of risk disclosure frameworks is presented in section 5 and the results of applying these frameworks in section 6. Differences in scores will be analyzed in section 7 by the development of a number of hypotheses. A summary of this research is finally presented in section 8.

2. Background risk and risk disclosures

2.1. Introduction

Regulation regarding financial reporting and disclosures has an impact on every firm. Financial reports and disclosures are however "potentially important means for management to communicate firm performance and governance to outside investors" (Healy and Palepu, 2001, 405). These disclosures can give information on several topics, including earnings forecasts, corporate social responsibility, segments and *risks.* This research focuses on risk reporting by banks, with the disclosures on this topic becoming less voluntarily in the past few years. First of all, the concept of risk will be clarified in section 2.2. Section 2.3. hereafter discusses in short what financial instruments and their risks are. The development of risk reporting and the institutional setting of Germany will be described in sections 2.4. and 2.5., and will among others show that there is a shift from voluntary risk disclosures to increased regulation on this topic.

2.2. Concept of risk

In the past, and more specifically the pre-modern era, people considered risk to be something negative because it was at that time associated with the occurrence of natural phenomena (Linsley and Shrives, 2006, 388: Lupton, 1999). Serious studies of risk started to be performed in the Renaissance by Pascal, Fermat and others who based this on advances in algebra and calculus, and in the 17th and 18th century modern techniques for quantifying risk were developed (Bernstein, 1996). In economics the concept of risk and uncertainty was introduced by Frank H. Knight (1921), who referred to risk as a 'measurable uncertainty' and considered uncertainty as non-quantitative.

Nowadays, in the modern era, there are according to Dobler (2008, 187) two views on risk: an uncertainty-based and a target-based view. The first "defines risk as randomness of uncertainty of future outcomes that can be expressed numerically by a distribution of outcomes" (Dobler, 2008) and is based on the concept of risk as introduced by Knight (1921). The second view, the target-based view, "defines risk as the potential deviation from a benchmark or target outcome" (Dobler, 2008, 187: Borch, 1968).

Risk is driven by internal and external factors, and is according to the ICAEW inherent in business. Both the ASB and ICAEW view risk as the "*uncertainty as to the amount of benefits*" and "*the term includes both potential for gain and exposure to loss*" (ICAEW, 1998, 5). Graphically, risk can be represented as in **figure 1** and **2** where both upside and down-side risk are distinguished based on the cash breakeven line. In the case of the upside risk profile, "all the results that have any likelihood of happening give a positive net cash flow" (ICAEW 1998, 7), in the case of the down-side risk profile there will be a negative net cash flow.

According to Beretta and Bozzolan (2004, 269) risk disclosures can as a consequence of the above definition be defined as "*the communication of factors that have the potential to affect expected results*". The definition of Linsley and Shrives (2006, 389) is however more extensive and includes the "*opportunity, prospect, hazard, harm, and threat of exposure*".
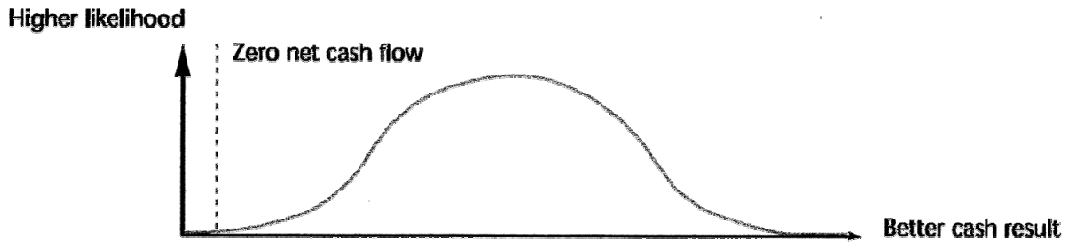
Figure 1 Upside risk profile
Source: ICAEW (1999, 7)
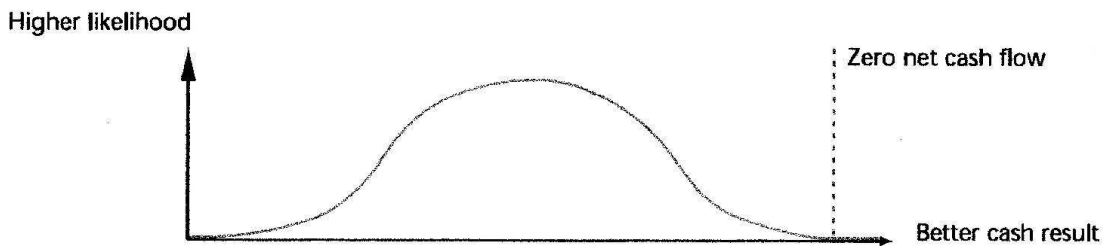
Figure 2 Downside risk profile
Source: ICAEW (1999, 7)

An important note to make is that under the German Law of Corporate Control and Transparancy (*KonTraG – Gesetz zur Kontrolle und Transparanz im Unternehmensbereich)* and the German Accounting Standard 5 *Risk Reporting* risk is interpreted in a narrow sense, as opposed to the broad definition of risk by, among others, the ICAEW (1998) and Linsley and Shrives (2006). GAS 5.9 defines risk as "the possibility of a future negative impact on the economic position of a group". Positive risks or chances are not included in this definition, but are included in § 289(1) and 315(1) of the German Commercial Code (*Handelsgesetzbuch, HGB).*

In view of the fact that banks are known to be major risk taking and risk management entities that make their money by taking risks, the broad and more general definition of risk will be used in this research. This includes past, future, good, neutral and bad news, and is in accordance with the modern view of risk as defined by the ICAEW (1998). Given that this research mainly focuses on the risks of financial instruments, the next section will explain what financial instruments and their risks are.

2.3. *Risks of financial instruments*

The introduction in section 1 already mentioned that for instance *collateralized debt obligations* are financial instruments, but there are many other financial instruments that a bank or any other company can have as well. According to the International Accounting Standards a financial instrument can be defined as "any contract that gives rise to a financial asset of one entity and a financial liability or equity instrument of another entity" (IAS 32.11) and can be divided into primary and derivative financial instruments. The first group of primary instruments includes

among others "receivables, payables, and equity instruments", the second groups of derivatives includes the more complex "options, futures, forwards, and swaps" (IAS 32 AG15).

Although the goal of having financial instruments, and especially the derivatives, is to make a profit on them or prevent losses with it, there is always some uncertainty about whether this goal will be achieved. This "uncertainty as to the amount of benefits" (ICAEW, 1998, 5) is a financial risk that the owner of a financial instrument faces and can be split up into different types of financial risks. In the International Financial Reporting Standards (IFRS) the risks of financial instruments are divided into three main categories: credit risk, liquidity risk and market risk whereby the latter includes currency risk, interest rate risk, and other price risk. The definitions of these types of risks can be found in the International Financial Reporting Standards and are summarized in **table 9** in **appendix I.**

In order to give an understanding of how information on these risks of financial instruments is disclosed in practice, **table 1** below provides some examples of disclosures in the annual reports of German banks.

Bank	Risk type	Disclosure in annual report
Commerzbank (2008, 155)	Market risk	Over the course of this year, market risk in the trading book – measured at a confidence level of 99 % and a holding period of ten days – rose sharply by €60.7m to a value at risk (VaR) of €96.3m. This was caused primarily by the sharp rise in market volatility in all asset classes, and accelerated again in the 4th quarter as a result of greater uncertainty after the Lehman collapse.
Deutsche Bank (2008, 69)	Credit risk	Credit risk arises from all transactions that give rise to actual, contingent or potential claims against any counterparty, borrower or obligor (which we refer to collectively as "counterparties").
HVB (2008, 39)	Liquidity risk	Within the framework of our limit system, which operates under conservative assumptions, we showed an overall positive balance of short-term liquidity risk of €16.8 billion (2007: €22.5 million) in HVB AG for the next banking day at the end of December 2008.

Table 1 Examples of risk disclosures

2.4. *Development of risk reporting*

Although risks in business have always existed, major corporate scandals in the past 30 years, the increasing complexity of business structures, a changing environment and technology, and the current crisis on the financial markets have increased the focus on risk and risk management. Before the ICAEW published the important discussion paper '*Financial Reporting of Risk – Proposal for a statement of Business Risk'* in 1998, both the Cadbury Report (1992) and the AICPA (1995) already gave considerable attention to the issue of risk reporting. The AICPA report focused on the changing needs of users of financial reporting and recommended to

provide more forward-looking information, including information about uncertainties and risks. The ICAEW report (1998, 5) adds to this that there is a concern about "*short-termism*" and more forward-looking information can help investors to focus on a longer-term instead.

The years after publication of these reports, more reports have been issued and the opinions about risk reporting have become more sophisticated (Turnbull Report, 1999; ICAEW, 1999; ICAEW, 2002). A part of this can be attributed to the discussion around corporate governance. The ICAEW now considers "*risk reporting to be a cornerstone of accounting and investment practice*" (Abraham and Cox, 2007, 227). This suggests that risk reporting is useful for the investors, but the company and its management itself can also benefit from it. The focus of regulators is, however, still on the users of financial statements.

In the past few years, risk reporting has become less voluntary, in particular with respect to financial instruments. The German Accounting Standards Board adopted already in 2001 German Accounting Standard No. 5 *Risk reporting*, with GAS 5-10 about risk reporting by banks. According to Homölle (2003, 1) this is the "first accounting standard worldwide that regulates risk reporting in a comprehensive manner". A few years later, the International Accounting Standards Board revised and enhanced the already existing regulation regarding the disclosures of financial instruments (IAS 32) due to the fact that "*the techniques used by entities for measuring and managing exposure to risks arising from financial instruments have evolved and new risk management concepts and approaches have gained acceptance*" (IASB, 2004, 3). From 2007 companies with financial instruments and that report in conformity with IFRS have to comply with IFRS 7, which requires specific risk disclosures in the annual report. For banks the requirements of Basel II pillar 3 are added to this since 2008, although a part of these requirements are similar to those in IFRS 7. If incorporated into national laws, companies in the EU member states already had to report on risks and uncertainties however since 2005, due to a change in article 1(14)(a)[3]. This resulted in similar requirements by the EU as the requirements in the German Commercial Code since 1998. The next section will describe these developments more in depth.

Particularly with respect to the changing regulation and the current turmoil on the financial markets it is interesting to examine how risk disclosures in annual reports of banks have developed in the past years. Since the empirical research part of this study focuses on German banks, it is however important to discuss the institutional setting of Germany first, especially since it is considered to be a forerunner in comprehensive risk reporting (Kajüter and Winkler, 2003).

2.5.   Institutional setting

2.5.1.   German banking sector

When thinking about Germany and banks one will immediately think about the European Central Bank (ECB) in Frankfurt am Main, but when looking in the centers of the cities one will also see a lot of offices from different banks. According to the Association of German Banks,

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[3] Modernisation Directive 2003/51/EC of June 18th, 2003

Germany has one of the highest densities of bank offices in the European Union[4] and the Bundesbank reports that there are in total 1980 reporting credit institutions at the end of 2008. In comparison to other countries around the world, the German banking industry is often called unique. Before examining the risk disclosure requirements and the risk disclosures of financial instruments in the annual reports, it is therefore important to discuss what some of the characteristics of the German banking industry are.

In general there are two types of financial systems that can be distinguished: bank-based and (capital) market-based systems. In a bank-based financial system banks play an important role in comparison to the bond and equity markets and Germany is an example of a country with this system. The United States is on the other hand a country with a typical market-based system.

Due to the bank-based financial system the German banking sector is of great importance for the German economy. According to Koetter et al. (2004, 2) banks are important "as financial intermediaries, as lenders to the corporate sector, and as part of the corporate governance system". Due to the liberalization of the financial markets in the EU the sector is however changing.

The German banking industry is often divided into three pillars, based on the range of activities, the organizational structure, and the ownership structure of the banks (Koetter et al., 2004, 27). All the types of banks that can be distinguished based on these criteria are presented in **figure 3**. The first distinction that can be made is based on the range of activities and result in two types of banks: universal and specialized banks. As distinct from specialized banks that only engage in a single banking activity, universal banks are allowed to "combine functions of commercial and investment banks, including securities business" (Association of German Banks, 2005, 5). Second, the organizational structure divides banks into commercial banks, cooperative banks, savings banks, building societies, mortgage banks, and special institutions. The final classification that can be made is based on the ownership structure and divides the sector into private and public banks. Mainly savings and specialized banks are part of the public sector, which means that these are "ultimately owned by the federal or state government" (Koetter et al., 2004, 27). The history of the development and characteristics of these types of banks will not be discussed in this research, for example Koetter et al. (2004) provide an extensive overview of this.

When examining the risk disclosures in the annual reports one might expect to find differences between the amounts of disclosures of these different types of banks. Some of the German banks are very large, internationally oriented and stock-listed, while others are for instance only regional, government owned banks. Between these banks there will be a different degree of information asymmetry, agency problems and amounts of financial instruments, which is expected to result in different levels of risk disclosures.

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[4] See http://www.germanbanks.org/html/12_banks_in_facts_figures/sub_01_markt/ban_0501.asp, retrieved on March 26, 2009
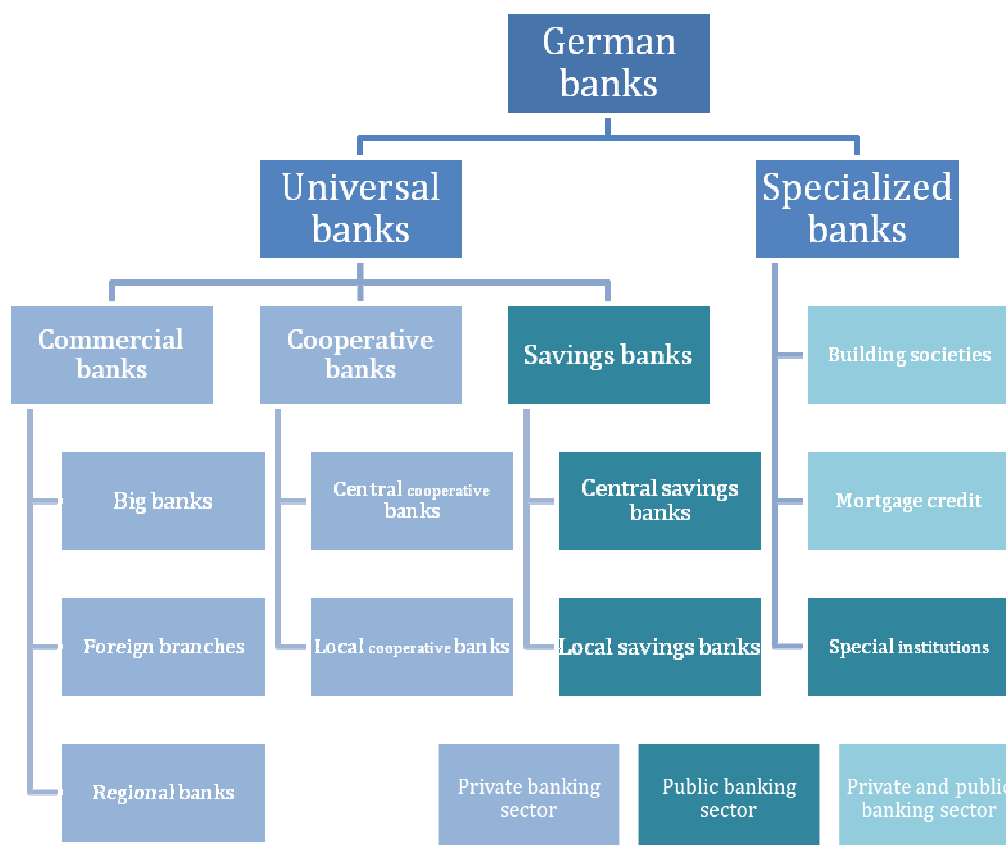
Figure 3 Types of German banks
Source: Koetter et al. (2004, 28)

Although the different types of banks as described above still exist, the German banking sector is since the '90s changing due to consolidation. According to Marsch et al. (2004, 1) the number of credit institutions in Germany has decreased more than in other European countries and **table 2** shows that particularly the number of local cooperatives and local savings banks decreased. The number of foreign branches is however increasing due to increased globalization, which consequently leads to more competition in the German banking industry. The big private universal banks that were already in the minority show on the other hand a decrease by 50% due to mergers and acquisitions. The recent acquisition of Dresdner Bank by Commerzbank in January 2009 is an example of this. In comparison with other countries, the public banks in Germany however still have a large market share.

Another characteristic of the German banking sector is that it is closely related with corporate governance, which deals according to Schleifer and Vishny (1997, 737) with "the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment". A term that is often mentioned in this context is 'relationship banking'. In order to receive a return on the capital a banks lends to a corporation, the bank might demand control rights like "direct shareholding, board representation, and proxy voting" (Elsas and Krahnen, 2004, 197). In the case of Germany, where banks are a major source of capital for corporations, this means that there are close relationships between banks and corporations and that the "market for corporate control is not an external, visible one as in the Anglo-Saxon model" (Koetter et al.,

2004, 12). One also speaks about 'hausbank' relationships, mostly between commercial banks and large corporations, and savings banks and small and medium enterprises (SME).

In summary, the German banking sector is of great importance for the German corporate sector and for the economy as a whole. Since banks have close relationships with the corporations to which they lend money, the banking sector is closely related to corporate governance. The discussion on corporate governance in the '90s led to an increased demand of disclosures, including risk disclosures . The next section will describe the development and requirements of mandatory risk disclosures in the annual reports of corporations in general and more specifically for banks.

2.5.2. Risk disclosure requirements

In Germany risk reporting was introduced in 1998 by an amendment to the German Commercial Code (*HGB*). From that moment Germany, which is considered to be a typical code law country, became a forerunner when it comes to comprehensive risk reporting (Dobler, 2008). The discussions about risk disclosures and corporate governance however increased in the beginning of the twenty-first century due to major corporate scandals of for instance Ahold, Enron and Worldcom.

In May 1998 the Law on Corporate Control and Transparency was introduced in Germany, which resulted in an amendment of paragraph 289 (1) and 315 (1) of the Commercial Code. Under these provisions companies have to report in their annual report about risks, chances and expected future developments, including the assumptions for this (HGB § 289 (1) and § 315 (1)). Due to the Fair Value Directive 2001/65/EC by the European Union[5], these paragraphs were amended again, now requiring reporting on the exposure to credit, price, liquidity and cash flow risk more specifically instead of the expected future developments (Dobler, 2005b).

Although the requirements on risk reporting were specified by the German Institute of Certified Public Accountants (*IDW – Institut der Wirtschaftsprüfer in Deutschland)* in the standard IDW RS HFA 1, the requirements were not legally binding. The German Accounting Standards Board (GASB), a private standard setting body, however built on these requirements and issued in 2001 the German Accounting Standard 5 – *Risk reporting* and German Accounting Standard 5-10 – *Risk reporting by financial institutions and financial service institutions.* As mentioned in section 2.2. risk is defined in this standard in a narrow sense, thereby only focusing on downside risk. The risk disclosures as required, but not explained in depth in this research, have to be made in a risk report as a part of the management report (GAS 5.30-5.33). What GAS 5 however lacks besides mandatory disclosures on upside risk as well, is the "demand of a description of the forecast arguments and techniques" (Dobler, 2005b, 1195). The difference with IDW RS HFA 1 is that GAS 5 mainly applies to group reports and the standard of the German Institute of Certified Public Accountants, although not legally binding, mostly applies to individual reports. GAS 5 is however recommended to be applied to individual reports (GAS 5.8), but this is not mandatory (GAS 5.1).

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[5] Directive 2001/65/EC of September 21, 2001, Art. 1 (4) amending Art, 46(2) of Directive 78/660/EEC, and Directive 2001/65/EC, Art. 2(3) amending Art. 36(2) of Directive 83/349/EEC.

The introduction of the Modernisation Directive 2003/51/EC resulted in the amendment of the 4th and 7th Company Law Directives (Dobler, 2005b, 1193). Since 2005 the member states of the European Union incorporated the concept of risk reporting in their laws, resulting in similar requirements on risk reporting as the German Commercial Code since 1998. The Modernisation Directive and the Reform Act on Accounting Regulation (*BilReG- Bilanzrechtsreformgesetz)* however also resulted in an adjustment of the German Commercial Code (§ 289(2) and § 315(2)). Not only risks are now required to be disclosed, also chances, risk management objectives, and the company's exposure to specific types of risk.

More specific requirements of risk reporting for banks are disclosed in Basel II, a capital agreement drawn up by the Basel Committee on Banking Supervision (hereafter The Basel Committee) and legislative since January 1, 2008. The Basel Committee was founded in 1974 with the objective to "enhance the understanding of key supervisory issues and improve the quality of banking supervision worldwide"[6]. The decreasing amounts of equity in relation to the supplied credits, as a consequence of the internationalizing and the forthcoming increased competition between banks, was the reason for founding the Committee, which has no legal force but issues standards, guidelines and recommends statements of best practice. In 1988 the Committee introduced the first capital measurement system, commonly referred to as the capital accord or Basel I. This framework has not only been adopted by the EU member states, but also in all other countries with international active banks[7]. The proposal for the revised framework was issued in 1999 and impact studies and extensive consultations resulted in the 2004 paper '*International Convergence of Capital Measurement and Capital Standards: A Revised Framework'*. This framework, now known as Basel II, consists of three pillars. Pillar 1 is primarily about the banks minimum capital requirements and pillar 2 sets out the roles and responsibilities of supervisors. Pillar 3 is in this case the most important one, because it sets out the risk disclosures that are required to ensure that the market discipline mechanism can work effectively. The main objective is to "encourage market discipline by developing a set of disclosure requirements which will allow market participants to assess … risk exposures, risk-assessment processes and hence capital adequacy of the institution" (Linsley and Shrives, 2005, 207). The disclosure framework of pillar 3 includes quantitative and qualitative disclosures for each separate risk area and also the risk management objectives and policies have to be described. The risk areas that are distinguished in Basel II include *credit risk, market risk, operational risk, equity risk and interest rate risk*. Because Basel II is implemented in guidelines 2006/48/EG PbEU L 177 and 2006/49/EG PbEU L 177 of the European Union, it is legislative for all banks and credit institutions in the EU and therefore also for German banks. No further attention to the disclosure requirements of Basel II is however paid in the remaining part of this research.

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[6] See www.bis.org/bcbs, January 16 2009
[7] See www.bis.org/bcbs/history, January 16 2009

| Year | Universal banks | | | | | | | Specialized banks | | |
| | Commercial banks | | | Cooperative banks | | Savings banks | | | | |
	Big banks	Foreign branches	Regional banks	Central cooperative banks	Local cooperative banks	Central savings banks	Local savings banks	Building societies	Mortgage credit	Special institutions
1990	10	60	207	6	3410	12	772	NA	37	20
1995	3	69	198	4	2591	13	626	NA	35	18
2000	4	90	200	4	1792	13	562	31	31	13
2005	5	89	158	2	1294	12	463	26	24	16
2006	5	93	158	2	1257	12	457	26	22	16
2007	5	96	159	2	1232	12	446	25	22	16
2008	5	103	164	2	1197	10	438	25	19	17

Table 2 Number of credit institutions (1990-2008)

Source: Banking statistics Deutsche Bundesbank

In addition to the Commercial Code, GAS 5 and Basel II, German banks also have to disclose about risks in conformity with the International Financial Reporting Standards, the accounting rules for all stock listed companies since January 2005 and for *all* banks since January 2006. Due to the increasing complexity of financial products and markets, the International Accounting Standards Board published at the end of the '90 IAS 32 *Financial Instruments – Disclosures and Presentation* and IAS 39 *Financial Instruments – Recognition and Measurement,* with the concept of fair value being heavily criticised in this period of turmoil on the financial markets. On August 15, 2005 they issued IFRS 7 *Financial Instruments – Disclosures*, which is approved by the European Commission on January 11, 2006 (regulation nr. 108/2006) and legislative from January 2007 for all companies that report in conformity with IFRS and that have financial instruments. It replaces IAS 30 and some elements of IAS 32. One of the reasons for issuing IFRS 7, that began to play a role at the late 1990s (IFRS 7 BC2), is that in "recent years, the techniques used by entities for measuring and managing exposure to risks arising from financial instruments have evolved and new risk management concepts and approaches have gained acceptance" (IFRS 7, IN1). Other reasons are the discussions on risk disclosures and the initiatives to improve the disclosure framework (Linsley and Shrives, 2005; IFRS 7 IN1), and the fact that transparency will allow users to make more informed judgments about risk and returns (IFRS 7 IN2).

IFRS 7.31 states that "an entity shall disclose information that enables users of its financial statements to evaluate the nature and extent of risks arising from financial instruments to which the entity is exposed at the reporting date". The risks that are distinguished in IFRS 7 correspond largely with Basel II pillar 3 and the comprehensive disclosure requirements in the German Commercial Code and include credit risk, liquidity risk and market risk (IFRS 7.32, **see** for definitions **appendix I**). In accordance to Basel II, IFRS 7.33 and IFRS 7.34 requires both qualitative and quantitative information to be disclosed.

Important to mention is that both Basel II and IFRS 7 demand risks to be disclosed 'through the eyes of management' and to be "consistent with the approaches and methodologies that the directors use to assess and manage the bank's risk" (Linsley and Shrives, 2005, 207). There are however certain differences between the requirements of IFRS and the German legislation. Since it is not the purpose of this study to summarize the requirements of different legislation and to address the differences between approaches, **table 10** in **appendix II** only provides an overview of this as drawn up by Dobler (2005b).

As mentioned in the introduction, recent developments on the financial markets resulted in considerable attention for the topic of risk reporting. Although IFRS 7 has become effective since January 2007, there are already made two amendments to it. The first one in October 2008 concerning disclosures related to the reclassification of financial assets, and the second one in March 2009 regarding the disclosures about fair value and liquidity risk[8]. Both of the amendments require additional disclosures on financial instruments and their risks. The exact requirements of IFRS 7 or any other discussed regulation or legislation will not be extensively described in this research. It should however now be clear that risk disclosures are for banks in general and for other companies with financial instruments not completely voluntarily anymore.

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[8] See http://www.iasplus.com/standard/ifrs07.htm

Despite early regulation in Germany, the focus of this research will be on the disclosure requirement by IFRS 7 since reporting in conformity with IFRS is mandatory for banks since 2005 (stock-listed) or 2006 (all banks).

3. Risk disclosure literature

3.1. Introduction

The emergence of risk reporting took place in the past ten to fifteen years and the attention on risks and risk reporting is now bigger than ever due to the situation on the financial markets. Information on the rationale behind risk reporting is important to understand why companies have an incentive to report about risks or should report about this according to regulators. This will be explained in section 3.2. Sections 3.3 and 3.4. discuss prior research on risk disclosures that provide us with empirical evidence from the past and which can be helpful for future research. Due to the limited amount of academic research on risk reporting by banks, empirical studies by audit firms will also shortly be explained.

3.2. Rationale behind risk reporting

Although regulators and standard setters mainly focus on the information needs of users of financial statements and therefore claim that risk disclosures are necessary, the companies itself can also benefit from it. First the rationale behind risk reporting from the information asymmetry and agency problem perspective will be explained. Next to that the information risk perspective, the political cost theory and the signaling perspective will be shortly discussed.

According to Healy and Palepu (2001, 406) information asymmetry and the agency problem cause the demand by outside investors for disclosures to be made by management. Information asymmetry, also described by Akerlof (1970) as the 'lemons problem', means that these investors and managers do not have the same extent of information, with the latter usually having more and better information. In the context of this research, the bank manager will have more information about risks that might affect future results than the share- or stakeholder. Consequently, disclosing more about these risks will result in a reduction of the information asymmetry. From the point of view of the stakeholder this is favorable since disclosed information can be taken into account in the decision making process. The agent will however be reluctant to remove some of the information asymmetry for the reasons that will be discussed later on in this section.

The agency problem arises due to the difference in interest between an agent and a principal, with the first being the manager and the latter being the shareholder (Jensen and Meckling, 1976; Fama, 1980). The problem here is that the agent has the incentive to act in his own-interest, which is not always in the interest of the shareholder. Healy and Palepu (2001, 410) describe several ways to reduce the agency problem, including compensation contracts, corporate governance, information intermediaries and disclosures.

Irrespective of the fact that disclosures in general might reduce the information asymmetry and agency problem, they might also result in reduced costs of capital. According to Helbok and Wagner (2006a, 9), from an information risk perspective, "investors demand of returns depends on the level of information provided to them through disclosures". Several empirical studies have tried to confirm the connection between risk disclosures and the cost of capital and found support that the cost of equity capital declines when the amount of disclosures increase (Botosan, 1997; Healy and Palepu, 2001; Hutton, 2004; Botosan, 2006). The ICAEW and IASB

share this view and also state that risk reporting will help companies in managing their risk and to improve their risk management. Last, but not least they also believe that information on risks will "improve accountability for stewardship, investor protection and the usefulness of financial reporting" (ICAEW, 2002, 7).

By disclosing more information about risks, shareholders are better able to understand the company's future economic performances and its market value (Schrand and Elliot, 1998; Linsley and Shrives, 2006; Abraham and Cox, 2007; Dobler, 2008). According to the Modern Portfolio Theory of Markowitz, this information is used in decision making and gives the opportunity to maximize shareholders' value (Markowitz, 1991; Solomon et al., 2000, Abraham and Cox, 2007). There are however according to Linsley and Shrives (2000) also two other perspectives on why companies, financial and non-financial, would disclose risk information: the political cost perspective and the signaling perspective.

According to Helbok and Wagner (2006a, 11) and based on the Political Cost Theory by Watts and Zimmerman banks will disclose more information in order to attract less attention from supervisors like the Authority of Financial Markets (AFM) or the central banks. Next to that, the signaling perspective suggests that banks want to distinguish themselves from each other and that especially banks that are performing well will be early adopters of risk disclosures (Helbok and Wagner, 2006a, 11). Others however suggest that the rest of the industry will imitate these early adopters (DiMaggio and Powell, 1983) and that the behavior of the dominant bank might shape the disclosures within an industry (Cooke, 1992).

Next to the above mentioned perspectives Dobler (2008, 186) "considers risk reporting to be an endogenous feature and, thus, are motivated from risk management and game setting perspectives". Incentives for risk reporting are important, even when there is regulation. It is however not always in the advantage of the company or manager to disclose certain information. Linsley et al. (2006) state that there are two reasons why managers are reluctant to do this. The first reason is that there is a 'problem of proprietary information', because information might be commercially sensitive and can give competitors an advantage. Second, there is the issue of forward-looking information. Although Solomon and Solomon (2004) examined that forward looking is found to be more useful in the decision making of investors and the ICAEW states this as well, forward-looking information is "unreliable and could leave directors open to potential claims from investors who have acted upon this information" (Linsley et al., 2006, 269). According to Dobler (2008) and its analytic models this threat of litigation is also one of the reasons why managers might not report on risks. Fuller and Jensen (2002) on the opposite however state that being clear about risks could prevent reputation damage.

Whether mandatory risk disclosures are better than voluntary risk disclosures can be questioned. According to Hutton (2004) and Solomon et al. (2000) voluntary risk disclosures are preferred, because relevant information cannot be standardized. Despite this, regulators and accounting standards boards continued to examine this topic and by now laws and regulations about risk reporting exist in certain parts of the world and for certain companies (for instance banks).

3.3. Empirical research on risk reporting in general

The past 30 years many researchers have examined voluntary disclosures in annual reports from different perspectives, including the capital market (Healy et al., 1999; Leuz and Verrecchia, 2000; Botosan and Plumlee, 2002) and positive accounting perspective (Cooke and Wallace, 1990; Ahmed and Courtis, 1999; O'sullivan, 2000; Adams, 2002; Camfferman and Cooke, 2002; Stanton and Stanton, 2002; Watson, Shrives and Marston, 2002). Recent studies focus more specifically on the topic of risk reporting in annual reports (Kajüter and Winkler, 2003; Beretta and Bozzolan, 2004; Linsley and Shrives, 2006; Abraham and Cox, 2007; Amran et al., 2009). Both studies on a specific type of risk, for example financial risk, and comprehensive studies have been performed by using content analysis to examine the annual report or parts of it.

Most of the studies on risk disclosures focus on non-financial companies in a particular country and examine among others the relationship between the level of risk disclosures and company size. Linsley and Shrives (2006) found in according to a study by Beretta and Bozzolan (2004) of 85 Italian stock-listed firms that also for a sample of 79 UK FTSE 100 listed firms there exists a positive relationship between the amount of risk disclosures and company size[9]. In the most recent study by Amran et al. (2009) this also holds true for a sample of 100 Malaysian stock listed companies, from which the narrative sections of the 2005 annual report are examined. There are however also other relationships with disclosure levels examined. For example, Abraham and Cox (2007, 244) examined risk disclosures in 71 UK FTSE 100 annual reports in 2002 by using content analysis and found that the number of dependent non-executive directors does not contribute to the amount of risk disclosures in the annual reports and that UK firms with a US stock exchange listing disclose more information on risks. Based on the agency theory dependent non-executive directors were not expected to contribute to risk disclosures since these directors are not "entirely independent of management, there being a business or other relationship that could in principal interfere with the exercise of independent judgment" (Abraham and Cox, 2007, 231-232: Mallin et al., 2005). More disclosures of firms with a dual listing (in the UK and the US) were however expected, since the SEC requires more risk disclosures and the costs of disclosing this information in the UK annual reports as well are low.

A more specific stream of risk disclosure studies focuses on risk disclosures in relation to derivatives and other financial instruments by financial and non-financial companies (Adedji and Baker, 1999; Rajgopal, 1999; Jorion, 2002; Dunne et al., 2004). For instance a study by Jorion (2002) investigated whether the Value-at-Risk (VAR) disclosures, "a standard benchmark for measuring financial risk" (911), that 8 US banks disclose "can predict future volatility in their unexpected trading revenues" (930). The result is that these disclosures by banks are found to be informative and meaningful, because this new information finds expression in the stock prices. Dunne et al. (2004) and Dunne and Helliar (2003) examined the influence of the implementation of a specific standard on financial instrument disclosures, FRS 13 *Derivatives and Other Financial instruments – Disclosures*. They not only found an increase in disclosures after the implementation, but also a market reaction. The effect of the implementation of IFRS 7

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[9] Company size is measured by taking the natural logarithm of market value and the natural logarithm of turnover. The Pearson correlation for market value is 0.467 and for turnover 0.364, both significant at a 0.01 level.

Financial Instruments – Disclosures has until now not been examined and will be a subject for future research.

Studies on risk reporting by German, mostly non-financial firms are performed by Kajüter and Winkler (2003), Fischer and Vielmeyer (2004) and Kajüter and Esser (2007). By examining the management reports of a sample of 83 German stock-listed companies and using content analysis, Kajüter and Winkler (2003, 219-228) found that the quantity of risk disclosures increased in the period 1999-2001, but that there was non-compliance with GAS 5 which became effective in 2001. In accordance with this study, Fischer and Vielmeyer (2004) achieved the same results by examining in total 346 management reports from the period 1999-2002. By using a disclosure index based on the requirements of GAS 5 they not only found an increase in the quantity of risk disclosures, but also concluded that mainly qualitative risk information was disclosed. A main result that was also found by Kajüter and Esser (2007) is that there is "a large variation in mandatory risk reporting" (Dobler, 2008, 191). For concluding this, and for providing evidence for the size effect as discussed above, the authors examined a total of 92 management reports of stock-listed companies in 2005.

The conclusion to be drawn from the research on the management reports of German listed companies is that the examined companies in general did not early adopt the requirements of GAS 5 in the years 1999 and 2000 and this provides more evidence for the expectation that the risk disclosures will increase after the introduction of IFRS 7 in 2007. Since there is also found a positive relationship between company size and risk disclosures for both banks (Linsley et al., 2006 and to be discussed in the next section) and German companies (Kajüter and Esser, 2007) in previous literature, one might also expect to find a positive relationship between risk disclosures and the size of German banks. Section 6.2. will elaborate more on this when discussing the developed hypotheses.

3.4. Empirical research on risk reporting by banks

The most relevant literature for this study is literature that includes empirical evidence about risk reporting by banks. However, this is still rather rare due to the limited amount of research on this topic. The literature that is available can be divided in two different streams: 'academic' research (Basel Committee, 1999, 2000, 2001; Linsley et al., 2006; Helbok and Wagner, 2000) and research by audit firms (e.g. PricewaterhouseCoopers, 2008; Ernst & Young, 2008; KPMG, 2008).

3.4.1. Academic research

The Basel Committee on Banking Supervision, hereafter called The Basel Committee, was the first to study this specific topic. After that they recommended banks in 1997 to disclose more information about their risk profile, they analyzed in the years 1999, 2000 and 2001 the disclosure levels in the annual reports of about 55 different banks from 13 countries all over world.

From 2001 three reports were published on this subject and the findings were based on a survey that included a total of a 104 questions in 12 categories[10] about different types of risk in the annual reports and which were filled in by the national banking supervisors with yes, no or not applicable. Categories of disclosures that were examined include *inter alia* market risk internal modeling, credit risk modeling, capital structure, and other risks.

In the 2001 paper, the Basel Committee concluded that there is a lack of disclosures in the area of credit risk modeling and internal and external ratings in the 1999 annual reports. Most banks on the other hand did that year "disclose certain key quantitative information concerning credit risk exposure and allowances" (Basel Committee, 2001, 3). For the year 2000 they concluded that the internal models for market risk are rather extensively disclosed, but that the disclosures of the results of stress tests should be improved (Basel Committee, 2002, 7). An increase in disclosures on other risks, defined as operational, legal, liquidity and interest rate risk, is remarked in the 2001 annual reports.

More conclusions of the Basel Committee can be found in the papers itself and are based on the comparison of disclosure rates during the years. These disclosures rates are calculated as the % of banks that disclosed on a pre-specified item. A remark on these studies is however that the sample changed during the years, which makes it less easy to make comparisons between the disclosure rates.

Linsley et al. (2006) conducted one of the first studies using content-analysis by counting sentences in the 2002 annual reports of a sample of in total 18 British and Canadian banks, divided into two groups of 9 banks selected from the database The Banker. By conducting this research they examined whether the size, profitability, risk level, and quantity of risk definitions of the bank have a positive relationship with the total quantity of disclosure levels (Linsley et al., 2006, 274). Hereby they made use of the disclosure model as used by Linsley and Shrives (2006) and Kajüter (2001).

In accordance with the studies by Linsley and Shrives (2006) and Beretta and Bozzolan (2004) of non-financial companies, Linsley et al. (2006) also found a positive relationship between bank size, as measured by the natural logarithm of total assets and the natural logarithm of market capitalization, and the total quantity of risk disclosures of banks[11]. No association was found between the amount of risk disclosures and bank profitability, and the amount of risk disclosures and risk level. Although there was not found a statistically different level of risk disclosures between Canadian and UK banks, further research is useful before more general statements about risk disclosures by banks can be made. A summary of the article by Linsley et al. (2006) can be found in **appendix III.**

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[10] These categories include capital structure, capital adequacy, market risk internal modeling, internal and external ratings, credit risk modeling, securitization activities, credit risk allowances, credit derivatives and other credit enhancements, derivatives, geographic and business line diversification, accounting policies, and all other risks (Basel Committee, 2001, 2).

[11] The results show a Pearson-correlation of 0.734 and significance of 0.001 for total assets, and a Pearson-correlation of 0.615 and significance of 0.015 for market capitalization. For total assets the correlation is significant at the 0.01 level and for market capitalization at the 0.05 level (Linsley et al., 2006, 279)

A more specific study on disclosures by banks is conducted by Helbok and Wagner (2006b) who examined a specific type of risk: operational risk. By using content analysis and a disclosure index with pre-specified items they examined the annual reports of 1998-2001 of 59 commercial banks in Nord-America, Asia and Europe. Based on the results they concluded that the extent and content of operational risk reporting increased in the examined time period and that the disclosure level of banks, when it comes to operational risk reporting, is "negatively related to a bank's equity ratio and profitability" (Helbok and Wagner, 2006a, 23). A less strong relationship is however expected in the future, since new standards and regulation will probably result in more disclosures.

The most relevant literature for this study on risk reporting by German banks is the study by Linsley et al. (2006). By examining different types of financial risk and testing relationships between the quantity of risk disclosures and firm specific characteristics, the conclusions from this study form an important driver behind the expectations of the outcomes of this research on the risk disclosures by German banks. The results are only to a certain extent comparable, since a different research method is used in this research. Instead of counting sentences as done by Linsley et al. (2006) this research will make use of a disclosure index. Section 5 will elaborate on this.

In order of importance for this paper, **table 11** *Empirical studies on risk reporting by banks* and **table 12** *Empirical studies on risk reporting by non-financial companies* in **appendix IV** provide an oversight of the most relevant academic literature as discussed in this section.

3.4.2. Other research

Apart from the academic studies on risk reporting, audit firms also study the topic of risk reporting and IFRS 7. In 2008 PricewaterhouseCoopers published a report in which they examined the 2007 annual reports of 22 banks worldwide, reporting under IFRS and US GAAP. In comparison with their 2005 survey they found that "there has been an overall improvement in the quality and breadth of disclosures compared to our previous survey, the level of improvement varied significantly across the surveyed banks" (PricewaterhouseCoopers, 2008, 11). Ernst & Young (2008) also conducted a study on disclosures by banks after the implementation of IFRS 7, and took a sample of the 24 largest European banks. One of their key findings is that "disclosures made by banks in the light of the credit crisis varied significantly, reflecting, in part, their varying degrees of exposure (2008, 3). These studies however do not clearly describe their research methods, but from the reports can be derived that they examined whether banks comply with the disclosure requirements of IFRS 7. As outcomes mostly their conclusions and best practices of risk disclosures are given.

KPMG on the other hand does clearly make use of a disclosure index framework in their 2008 Best Practice Risk Disclosure Survey in which they examined a sample of 25 European banks and 14 insurance companies and their 2007 annual reports. The banking framework as developed consists of 6 types of risk and in total 160 items on which a grade between 0 and 5 can be scored. Regulatory requirements, recommendations, emerging ideas and best practices are taken into account in the development of the framework (KPMG, 2008, 12). The results of the survey of the annual reports by KPMG are presented in **figure 4**. Credit risk turns out to be the risk area in which disclosures are the most developed, in contrary with the business risk area

which is the weakest. Another result is that the requirements by regulation are in general less developed than the best practices by banks (KPMG, 2008, 12).
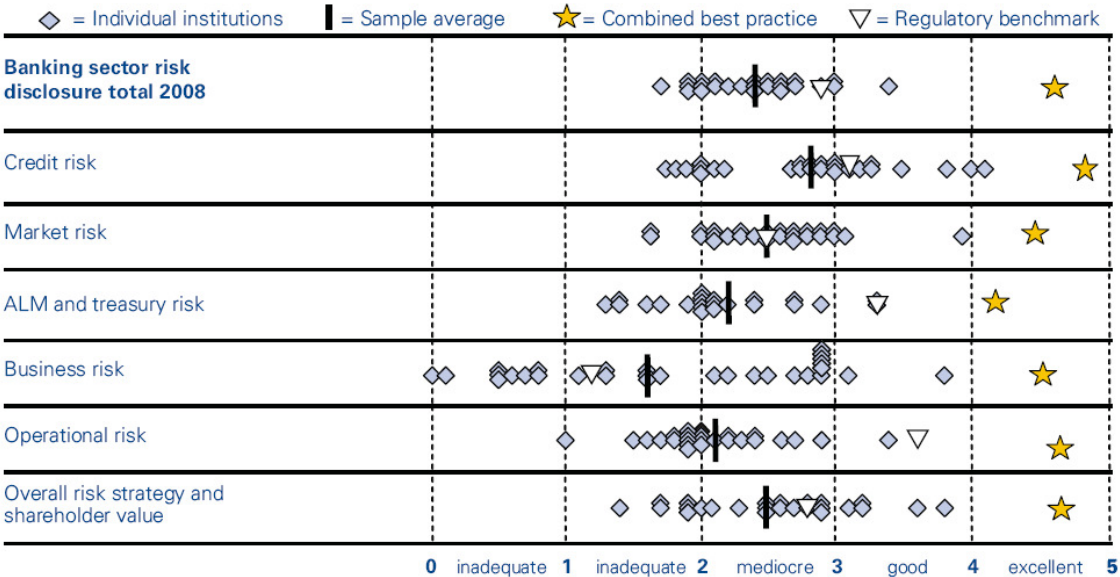

Figure 4 Results KPMG survey 2008 for the banking sector
Source: KPMG (2008, 12)

4. Content analysis

4.1. Introduction

Communication can take place in many forms. Corporate and accounting information is nowadays not only disclosed in annual reports anymore but also on websites, press releases and in conference calls. When examining these disclosures, and more specially risk disclosures, mostly content analysis is used as the research method. Section 4.2. will elaborate on this and will explain several approaches of content analysis in general. Hereafter a previously used research model for measuring the quantity of risk disclosures will be discussed in section 4.3. Since there however several limitations of this type of research, and therefore as well for this research, it is important to discuss these limitations in section 4.4.

4.2. Approaches

In many prior research risk disclosures are measured by using content analysis (e.g. Kajüter and Winkler, 2003; Beretta and Bozzolan, 2004; Linsley and Shrives, 2006, Linsley et al., 2006; Abraham and Cox, 2007; Amran et al., 2009). The methods used and the several approaches that can be distinguished will be discussed in this section.

Content analysis is according to Weber (1985, 9) "a research method that uses a set of procedures to make valid inferences from text". Babbie (2007, 319) gives a more clear description by calling it "the study of recorded human communication", that can be classified as unobtrusive research in which social behaviour is studied but not affected. Based on some conceptual scheme elements of communication, for example words, sentences and paragraphs can be classified into different categories (Babbie, 2007, 345). This research will make use of this method and examines risk information after publication in the annual report without the intention to affect future disclosures. This can however be done in different ways.

According to Beattie et al. (2004, 207), and shown in **figure 5**, there are two principle ways of measuring disclosures and their quality. The first way is to use subjective analyst disclosure quality rankings and the second way is a semi-objective way, in which the amount of disclosure is used as a proxy for the quality of disclosure. The semi-objective approach is the most used one and can be divided into approaches that encompasses all the text: thematic meaning-oriented content analysis, readability studies, linguistic analysis, and approaches known as disclosure index studies "that specify ex ante a list of items and scrutinise the text for presence, ignoring sections of the text that do not relate to this list" (Beattie et al., 2004, 208) This approach is for instance used by Botosan (1997). Each of these five approaches is discussed more in detail below. Subsequently a computer-assisted disclosure model, introduced by Beattie et al. (2004) will be discussed.

Subjective ratings have been used in many studies in the US and make use of ratings of disclosure quality based on analysts' perception. The Association of Investment Management and Research (AIMR) published these rankings in the past, with 1995 as the last year. There is however a lot of critique on this approach. Lang and Lundholm (1993, 247) argue that actual disclosures are not measured and that the rankings are only based on the perception of analysts. Healy and Palepu (2001, 425-426) add to this that "it is unclear whether the analysts on the

AIMR panels take the ratings seriously, how they select firms to be included in the ratings, and what biases they bring to the ratings". In the past the AIMR ratings have been used in studies by Healy et al. (1999), Bushee and Noe (2000), Botosan and Plumlee (2002), and Byard and Shaw (2003).

Disclosure index studies specify the items to be studied ex ante and make use of a coding scheme (Beattie et al., 2004). A binary or ordinal scheme can be used for this, with the first checking if an item is present or absent and the latter frequently using three levels. For example Botosan (1997) used an ordinal weighted scale in which a quantified disclosure scored a 2, a qualified disclosure a 1 and no disclosure a 0. It is weighted because extra points are given to quantified disclosures. The amount of disclosures is then assumed to be a proxy for the quality of disclosure (Beattie et al., 2004, 210). Disclosure index studies can also group items into hierarchical categories, this has been done by Vanstraelen, Zarzeski and Robb (2003) and Robb, Single and Zarzeski (2001). The critique on this method is according to Marston and Shrives (1991) however that the construction of the disclosure indices involve subjective judgement.

The other three approaches will only be very shortly explained. Thematic content analysis focuses on which topics are disclosed in the annual report or in sections of it. This kind of study is for example performed by Rutherford (2002). According to Beattie et al. (2004, 212) readability studies are designed to "quantify the cognitive difficulty of text" and to compare the outcomes with external benchmarks to evaluate the degree of difficulty. At last, linguistic analysis can be performed. This method is introduced by Sydserff and Weetman (1999), is also called the texture approach, and studies the language used in the text.

According to Beattie et al. (2004), the earlier mentioned approaches have two limitations. First, they are mainly one-dimensional, just classifying the topic to which the information item refers and then often only measure the presence or absence of a disclosure on a classified topic. Second, the approaches are partial; they do not analyse the entire content of a corporate annual report. To solve these two limitations Beattie et al. (2004) introduce in their paper a new approach for measuring disclosures, '*the computer-assisted disclosure profile'* which makes use of a program called QSR NUD*IST. This is a multi-dimensional approach and aimed at analysing all of the narrative sections in the companies' annual reports. Due to the research questions of this research the approaches will not be discussed further in detail. But it will be clear now that concerning content analyses different approaches can be used for measuring risk disclosures.

4.3. *Previously used model*

An approach that is previously used in risk disclosure studies makes use of a model created by Arthur Anderson (**appendix V** and also known as the Deloitte model, Groenland et al. 2006) and is published by the ICAEW in 1998. According to Linsley and Shrives (2006), Kajüter (2001) was the first to use this model. Other studies by Linsley and Shrives (2006) and Linsley et al. (2006) consequently make use of this model in their specific risk disclosure studies, because the use of it by Kajüter (2001) "lends some credence to its adoption" (Linsley and Shrives, 2006, 393).

Content analysis of narratives in annual reports

Subjective analyst disclosure quality ratings

Semi-objective approach

Disclosure index studies

Textual analyses

Binary or ordinal coding scheme

Weighted or unweighted index

Thematic content analysis

Readability studies

Linguistic analysis
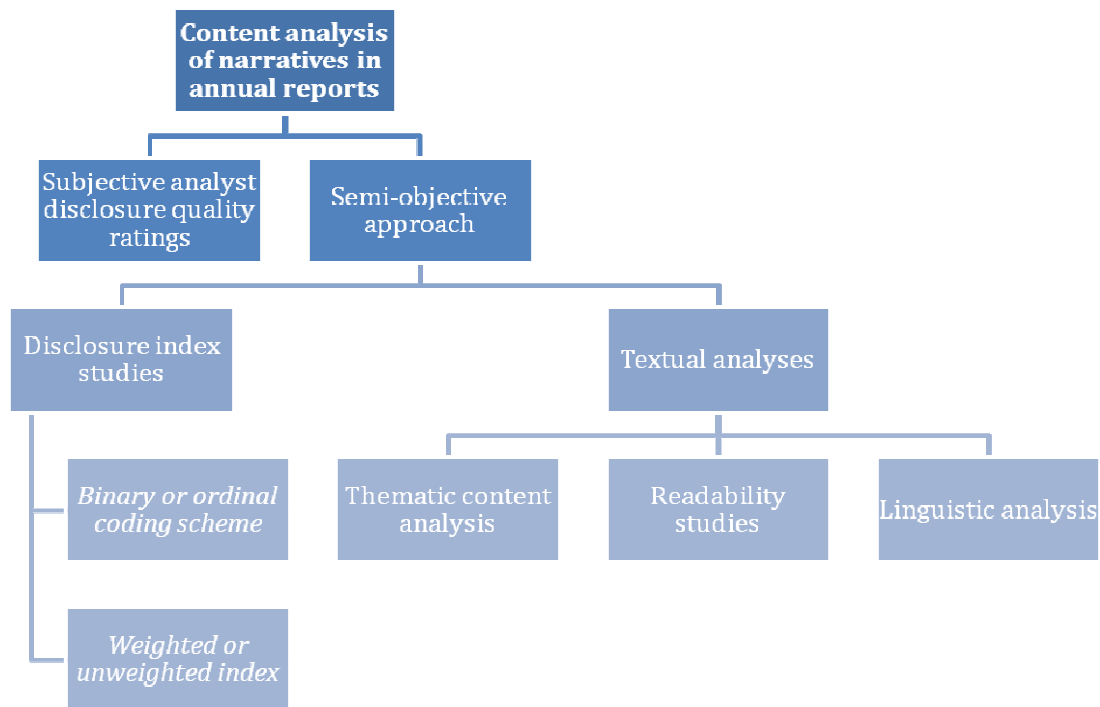
Figure 5 Approaches to the analysis of narratives in annual reports
Source: Beattie et al. (2004, 209)

The model used by the previous mentioned authors categorizes risks and specifies sentence characteristics. Analyzing the content of the text can be performed by counting the words, sentences or pages on these specific risks and characteristics. Although most of the time words are counted, because these can be counted with a high degree of accuracy, Linsley and Shrives (2006) count sentences because "words cannot be coded to different risk categories without reference to the sentence" (393).

For studying the risk disclosures by UK and Canadian banks, Linsley et al. (2006) made use of the disclosure coding grid as disclosed in **appendix III**. The risk categories as defined in this model are based on Basel II, and include next to credit risk, market risk, interest rate risk and operational risk also the categories capital structure and adequacy risk, and risk management framework and policies. An amount of 13 sentence characteristics are defined, as partially adopted from Hackston and Milne (1996), and focus on quantitative/qualitative information, good/bad/neutral news, information on the future or past, and definitions. For doing research with this model, risk disclosures in annual reports need to be coded and sentences have to be counted. As described in **appendix III,** which provides a summary of this empirical research, Linsley et al. (2006) calculated not only the total number and percentages of certain disclosures, but also the Pearson's correlation coefficient for the variables. The outcomes of this research are already discussed in section 3.

Although the model of Linsley et al. (2006) is explicitly mentioned in this section, there are for this research on the risk disclosures by German banks several limitations to this model. First of all, time is a major limitation.. The coding of every sentence in the annual reports requires a lot of time and is too time-consuming to perform by a single coder in a couple of months. Coding less annual reports will however result in less strong evidence and is therefore not a good option. The second limitation of the study of Linsley et al. (2006) is that their model only measures the quantity of information and not explicitly the quality as well. According to Botosan (1997) and the author of this research disclosure quality is however very important. Especially since not all the disclosed information is always relevant for decision making. Another limitation is that the model only takes into account Basel II pillar 3 and not the mandatory disclosures of IFRS 7. At the time the model of Linsley et al. (2006) was developed, IFRS 7 was however not mandatory yet. For this research it is important to take these disclosure requirements of IFRS 7 into account, because with respect to financial reporting this became very important regulation for banks in the past two years. Section 5 will elaborate on this.

Due to the above mentioned reasons, the disclosure model as discussed in this section will not be used but adapted to partially overcome some limitations. There are however still some other limitations of content analysis prevalent, which will be discussed extensively in the next section.

4.4. Limitations

A major limitation of content analysis in general is that it is inevitably subjective. Despite this, it is according to Krippendorff (2004, xiii) "one of the most important research techniques in social sciences". The coding method and procedure to be used should however be reliable and valid, with valid meaning that "the variables generated from the classification procedure represent what the researcher intended it to represent" (Beattie et al., 2004, 214). Krippendorff (2004, 214-215) identifies the following types of reliability: stability, reproducibility, and accuracy.

The weakest form of reliability is stability, which refers to consistently coding the data and performing *tests* and *retests* by the same coder. A stronger form is reproducibility, also known as *intercoder reliability*, with a *test-test* design and in which multiple coders are involved in coding the data (Weber, 1998). Reliability can however best be achieved by accuracy and a *test-standard* design. This involves "assessing coding performance against a predetermined standard set by a panel of experts, or known from previous experiments and studies" (Milne and Adler, 1999, 239).

As already mentioned in section 4.3., analyzing the content of for example annual reports can be performed by counting words, sentences, page proportions or the number of pages that include risk disclosures. According to Unerman (2000) words can be counted with a high degree of accuracy, but cannot be coded with reference to the sentence and can only be interpreted within the context of a sentence or paragraph (Linsley and Shrives, 2006, 393). Therefore, *inter alia* Beretta and Bozzolan (2004), Linsley and Shrives (2006), Linsley et al. (2006), Amran et al. (2009) make use of counting sentences, with more recently Abrahamson and Cox (2007) counting words. Hackston and Milne (1996, 86) however also consider sentences to "provide more reliable measures of inter-rating coding than words" and a more reliable measurement unit than pages or paragraphs. A problem arises on the other hand when companies adapt their writing style to influence the disclosure measurement outcome (Abraham and Cox, 2007, 236).

At the sentence level of analysis it might be too piecemeal to pass for risk-related information (Beretta and Bozzolan, 2004), which is therefore a limitation of studies making use of counting words. Studies by Zeghal and Ahmed (1990) and Lajili and Zeghal (2005) combine both words and sentences to partially overcome this limitation. Another way to overcome this limitation is however to examine paragraphs or annual reports as a whole, by not measuring the amount of text on a topic but by specifying items ex ante and examine the text on the presence of these items. This is called a disclosure index study as already discussed.. The limitation of this type of content analysis is according to Marston and Shrives (1991) however that the construction of the disclosure index always involves subjective judgment.

Another limitation of content analysis is that most of the studies based on it only focus on the quantity of information in relation to other variables. On the other hand, in other studies the quantity of information is also assumed to be a good proxy for quality by using quantity indices to state something about the quality as well (Marston and Shrives, 1991; Zarzeski, 1996) or by using weighed indices for each item (Botosan, 1997) or type of measure disclosed (Guthrie et al., 1999). Beretta and Bozzolan (2004, 285; 2008) disagree with this "because the disclosure of risk is intrinsically narrative", and also Beattie et al. (2004) state that quality cannot just be based on quantity. Quality depends according to Beretta and Bozzolan (2004) on the quantity and richness of content, but no support for this is given (Botosan, 2004). The author of this research agrees with Beretta and Bozzolan (2004, 2008) that quantity is not per se a good proxy for quality, but thinks that there are other ways to examine the quality of information besides measuring the economic sign (positive/equal/negative) and type of measure (financial/non-financial, quantitative/qualitative). The qualitative characteristics of information as defined in the IASB framework and by the Basel Committee (1998) are also important to take into account, although Beretta and Bozzolan (2008, 340) call the measurement of these characteristics impracticable, but perhaps only because they have not tried to develop a framework based on these characteristics yet. Botosan (2004) shares the view about the qualitative characteristics of information, but only takes the IASB framework into account. According to Botosan (1997) it is however difficult to assess the quality of information, but still very important. Therefore Beattie et al. (2001, 2004) and Core (2001) also state that improved and effective frameworks for measuring disclosure quality should be developed.

A last point to discuss here is whether, in the context of this research, the annual reports of banks are the most appropriate place to disclose information on risks, and consequently whether the disclosures in annual reports can best be studied to provide evidence supporting the hypotheses drawn up in this research. In an article about the transparency and risk disclosures in the banking sector, Linsley and Shrives (2005) doubt the appropriateness of annual reports due to the frequency of risk disclosures and the coherence of risk disclosures. With respect to the frequency The Basel Committee recognizes that "relevant risk information has a limited shelf life and can quickly become outdated" (Linsley and Shrives, 2005, 211). Therefore Basel II pillar 3 provision 818 requires reporting about risks semi-annually, or on a quarterly basis when "information on risk exposure or other items is prone to rapid change". To achieve coherence of risk disclosures The Basel Committee considers the annual report to be the logical place, but provision 815 of Basel II makes clear that risk information can also be disclosed on publicly accessible websites or public regulatory filed reports with bank supervisors. The annual report is however preferred, because "this enables the reader to obtain a coherent risk picture without difficulty" (Linsley and Shrives, 2005, 211).

As far as this research is concerned, only the annual reports of banks will be examined. Marston and Shrives (1991) and Lang and Lundholm (1993) also consider the annual report to be an influential source to communicate firm performance with investors and is therefore also examined in a study on forward-looking information by Beretta and Bozzolan (2008). Another reason is that, although the Basel Committee on Banking Supervision allows disclosing the information as required in Basel II outside the annual report, IFRS 7 still requires disclosing information in the annual report.

5. Risk disclosure frameworks

5.1. Introduction

The first part of this research outlined the theoretical background of risk disclosures and discussed previous empirical research and research methods. This second part will describe the construction and application of disclosure frameworks that can measure the quantity and quality of risk disclosures in the annual reports of German banks. These banks are known to be major risk taking and risk management entities and "as part of good corporate governance, it is expected that relevant risk-related information will be released to the marketplace" (Linsley and Shrives, 2005, 205). The extent of disclosures is however expected to differ. Before discussing these differences in disclosure scores in section 6, sections 5.2. and 5.3. will first describe the developed disclosure index frameworks. In section 5.4. the limitations of the framework will be described and in section 5.5. the difference between quantity/quality and quantitative/qualitative information.

5.2. Disclosure framework quantity

The objective of this study is to examine the risk disclosures of banks and to analyze the possible differences in disclosures. For the researcher it is important to find out how you can measure what you want to measure. One should thereby ask them self what one wants to examine, how this can be examined and how this will be examined. The following sections will elaborate on this.

5.2.1. Selection of content analysis approach

In section 4 on content analysis and its limitations it is discussed that in the case of narratives in annual reports content analysis can be applied to words, sentences, paragraphs or pages. One way of measuring the quantity of risk disclosures is for instance by counting the sentences and classifying them into different categories based on type of risk and sentence characteristics (see Linsley et al., 2006). There are however certain limitations to this approach. Since every sentence in the annual report has to be coded manually, this method is very time-consuming. Next to that, it is possible for companies to adapt their writing style to influence the disclosures scores (Abraham and Cox, 2007, 236). In order to overcome these limitations a new framework has been developed that does not literally count the quantity of risk information in annual reports but specifies items ex ante and can be used to screen the annual reports on the presence of these items. The framework as developed is presented in **appendix VI** and consists of a number of 59 items. In order to give an understanding of this framework, the rationale behind the construction of it, including the components, will be discussed.

5.2.2. Selection of risks

An organization has to deal with different types of risk. The Business Risk Model as developed by Arthur Anderson, and which is now sometimes called the Deloitte model, summarizes these different types. As mentioned as one of the demarcations of this research is however that only the risk disclosures of financial instruments will be examined in this research, since banks earn an important part of their income by financial instruments and the attention on these types of

risks is nowadays due to the developments on the financial markets larger than ever. The risks of financial instruments can according to IFRS 7.32 be divided into credit, liquidity, and market risk, with a subdivision of the latter into interest rate, currency and other price risk. All other types of risk, including the other specific banking risk called operational risk, are not included in the disclosure framework and not taken into account in this research as a whole.

5.2.3. Selection of risk items

After selecting the types of risk and the research method, the disclosure index has to be constructed. Since no specific disclosure indexes for the risks of financial instruments of banks are available, a new index is constructed based on the from 2007 mandatory disclosure requirements of IFRS 7.
A workgroup of "auditors, preparers and regulators, drawing on their expertise in banks, finance companies and insurance companies" (IASB press release, 2004) helped the IASB in developing this IFRS 7 that will according to the chairman of the IASB, sir David Tweedie, "improve financial reporting by helping users to understand the significance of financial instruments in financial statements, by giving information about companies' capital and by revealing more clearly the risks attached to holding financial instruments". The items included in the framework are based on IFRS 7.31-42, which correspond to the requirements of Basel II pillar 3 and the German Commercial Code. The disclosure requirements of Basel II pillar 3 are however not taken into account since these disclosures do not mandatory have to be disclosed in the annual report, but can also be disclosed in other reports. The requirements of the German Commercial Code are not taken into account since IFRS 7 has become mandatory for all the banks since 2007 and replaces local requirements.

Although the requirements of IFRS 7 were not mandatory before 2007, the framework can also be applied to the annual reports of other years since the risks of financial instruments have not changed over time. Next to that the framework will be applicable to banks in different countries, whether or not they report in conformity with IFRS. The framework can therefore be used for future research as well. A noticeable reader will however conclude that banks will obtain a score close to 100% in 2007 and 2008 simply because the items in the framework are mandatory to disclose since 2007. However, full compliance with IFRS 7 is not guaranteed and this research has not the purpose to examine compliance with the standards. According to auditors in the Financial Institutions (FS) sector of Ernst & Young and KPMG banks did not always fully comply with IFRS 7 in 2007, but perhaps only due to the fact that this was the first adoption year.

Since the risk items are included in **appendix VI** these will not be explained more in depth in this section. The rationale behind requiring these disclosures can be found in the basis for conclusions on IFRS 7.

5.2.4. Allocation of points

In order to give a disclosure index framework the possibility to measure disclosures that can be compared between banks and years, scores have to be allocated to the different items. In this research equal scores are allocated to each item; one point for disclosure and zero for non-disclosure. In this way the quantitative framework acts as a kind of checklist for the researcher

and makes the measurement of disclosures more easily and faster than by counting words or sentences. Section 5.6. will elaborate on the calculation of the disclosure scores.

5.2.5. *Applying the framework*

After construction the quantity framework is cross-country applicable since it is based on worldwide adopted accounting standards. Because IFRS 7 applies to all companies with financial instruments the framework might even be applied to different industries as well, although for banks the disclosures are much more important and therefore expected to be more comprehensive. In this study the framework is however not intended to be used for a compliance study and no statements about whether a particular bank complies with the regulation will be made. The focus will be on a single industry and a single country. More research is therefore necessary to examine the differences between industries and countries.

5.3. **Disclosure framework quality**

The same research method, a disclosure index study, for measuring the quantity of information can be used to measure the 'quality' of information as well. It is however the question what is understood by the quality of credit, market and liquidity risk information. Section 5.3.1. will discuss this before an explanation of the included items in the framework is provided in section 5.2.3. The same as for the quantity framework, the quality framework can hereafter be applied to the annual reports of banks and acts as a checklist for the researcher.

5.3.1. *Quality of information*

Before developing a framework to measure the 'quality' of information, it has to be clear what 'quality' is. In literature there is however no unambiguous definition given for this.
According to Van der Pijl (1994, 35) the quality of information is "the extent to which the features of data meets the requirements that result from the utility goal of information". In relation to financial reporting quality depends on the information needs and usefulness of the financial information to its users (Hoogendoorn and Mertens, 2001; McDaniel et al., 2002). It is however unclear what these needs in the area of risk disclosures are; for instance surveys among users of annual reports are necessary to examine this in practice.

Over the years several reports by different committees and institutions have been issued that discuss the quality of financial reporting. Internationally there has been developed a conceptual framework that includes qualitative characteristics of information, and this framework is adopted by among others the FASB and IASB. Previous research on the quality of risk disclosures by Beretta and Bozzolan (2004, 2008) was however not based on this framework, but measured the quality by the quantity and richness of disclosures[12]. According to them width, as influenced by coverage and dispersion, and depth, as influenced by the outlook profile[13], type of measure[14], and economic sign[15], determine the richness of disclosures. Botosan (2004, 289) however states that they do not provide any support for this and introduces the new premise in

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[12] Quality = f(Quantity, Richness of content)

[13] Historical, forward-looking or non-time specific

[14] Financial or non-financial; quantitative or qualitative

[15] Positive, negative or not disclosed

which quality is a function of the qualitative characteristics as defined by conceptual frameworks of for instance the IASB[16]. This framework, which was issued in 1989 and adopted by the IASB in 2001, describes some qualitative characteristics of information that determine the usefulness of information in financial statements for the (economic) decision making process of stakeholders[17]. These characteristics are understandability, relevance, reliability, and comparability and will be explained more in depth in section 5.3.2. The Basel Committee (1998) adds to this the characteristic of comprehensiveness, which "often implies the aggregation, consolidation and assessment of information across a number of activities and legal entities" (5.54).

In developing a framework to measure the quality of information it is assumed that 'quality' depends on the usefulness of information and that this usefulness is determined by the qualitative characteristics of information as defined by accounting standards boards. The next section will elaborate on these characteristics and explain how the framework as developed for this study is based on this. The characteristics of relevance does however also comes back in the quantity framework, since the requirements of IFRS 7 are based on what the user of information considers to be relevant information for decision making. Therefore the 'quality' framework acts as a kind of extra framework that next to relevance also takes into account the other qualitative characteristics and items that are not mandatory on the basis of IFRS 7.

5.3.2. Quality items

The developed framework to measure the quality of risk information in the annual reports of banks is based on the qualitative characteristics of information as described by among others the IASB. This section will describe these characteristics more in depth and points out how these are captured in the framework. An important note to make here is however the framework has the limitation that the quality items included in it are based on theory that explains what kind of information is useful in the decision making process of mainly the investors. No research on what investors truly demand has been performed until now, at least not with respect to the risk information of financial instruments. Due to this, the list of quality items is not limited. Further research is necessary to find out what information with regard to financial instruments is truly demanded and used in decision making processes.

The quality disclosure index framework is included in **appendix VII**.

5.3.2.1. Relevance

According to the IASB framework relevant information is defined as "information that has the ability to influence economic decisions" (F26-28). In contrast to the other qualitative characteristics, as described below, this study takes for relevance only the shareholders as a user of financial statements into account due to the lack of research with respect to the risk information needs of stakeholders.

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[16] Quality = f(Understandability, Relevance, Reliability, Comparability)

[17] The conceptual frameworks of the FASB and ASB on the other hand focus only on investors and creditors

Not only relevant information will influence the (economic) decision making of a shareholder, also the perceptions of the shareholders influence behavior (Slovic et al., 1980; Viscusi et al. 1986). The perception of influence can however lead to unintended interpretations and can adversely affect the shareholders decision making. In this study this is not taken into account.

In order to determine what information items might be relevant for shareholders it is important to get to know how shareholders make decisions.

A shareholder has three decisions he can make concerning the ownership of shares of a bank or any other company: holding, buying or selling the shares. To understand the decision making it is necessary to know what the interest of a shareholder is. According to Van den Assem et al. (2004) this is creating the higher return on the shares. In the literature there is consensus about how to determine which investment creates the highest return (Van den Assem et al., 2004). The method for this is known as the Net Present Value method and calculates the present value of all the present and future cash flows, whereby the invested amount is treated as a negative cash flow. The future cash flows are however not known in the present and need to be estimated. Barron, Kile and O'Keefe (1999) show that forward-looking information has a substantial effect on earnings forecasts and this kind of information will therefore influence the outcomes of the Net Present Value and a shareholders decision making. In accordance with this cash flow theory and other research forward-looking information is therefore assumed to be relevant for shareholders.

The disclosure requirements of IFRS 7, which are considered to be relevant for the users of the annual reports as well, are not taken into account in the 'quality' framework. The items below are included in the framework due to its forward looking character. Information on stress scenarios for instance informs the user of the annual report about whether the bank has enough equity to survive a recession or whether it needs to attract more capital. By describing the expected future impact of the financial crisis the shareholder knows that he might need to take into account for instance that more impairments are necessary in the coming years or that things in the organization will change because of the crisis. Information on risk management is therefore also important since it describes how risks are and will be handled in the future. Another item is the disclosure of VaR estimates and the exceeding of limits. Disclosing information about this gives the user of the annual report an idea of what the losses of a bank may be in a certain time period and for a certain confidence interval. If the banks exceeds these limits and reports about this the user of the information knows that the risk might possibly not be managed or measured well enough in the past and the bank can explain what can and will be done about this in the future.

The following items are included in the framework due to its forward looking character. This however does not mean that the items included in the quantity framework and IFRS are not relevant.

• Disclosure of information on stress scenarios
• Disclosure of the expected future impact of the financial crisis on the bank and its results (in the 2007 and 2008 annual reports)
• Disclosure of information on risk management of credit, liquidity and market risk
• Disclosure of whether VaR estimates and limits have been exceeded in the year

5.3.2.2. Comparability

According to the IASB framework comparability means that users must be able to compare information over time and between enterprises, which might lead to better decision making (IASB, 2001, F.39-42). Not only the comparability of information of the financial position and performance of a company is meant by this, also the information about for instance accounting policies adopted and risks. This does however not mean that changes in accounting policies are not allowed or are unfavorable. In this specific study on financial instrument risk disclosures by banks the mandatory adoption of IFRS 7 is an example of a change in accounting policies that is intended to increase the quality of financial reporting.

Examples that will increase the comparability of information are given by among others the Basel Committee and the IASB. In a paper on enhancing bank transparency the Basel Committee (1998) points out that the comparability of annual reports can be improved by "providing comparative figures in respect of one or more previous periods for numerical information" (5.60). These comparative figures can be presented in different ways, for instance by showing absolute and relative numbers of risk and exposure in different years in tables/graphs or in the text. An explanation of whether the measurements of risks possibly deviate from previous years will also increase the consistency and comparability of these figures over time and between banks. Mentioning the accounting standards applied will next to that increase the comparability, but mainly in the years before IFRS became mandatory.

In the disclosure framework the following items are included that are related to comparability:

- Comparability of the presentation of information of a specific bank over the years
- Comparable figures of previous years disclosed by a specific bank over the years
- Comparable measurement methods used or explanation for changes given
- Accounting standards for (risk) disclosures mentioned

5.3.2.3. Reliability

According to the Basel Committee (1998) information is reliable when it "reflects the economic substance of events and transactions and not merely their legal form, is verifiable, neutral (i.e. free from material error or bias), prudent, and complete in all material aspects" (5.58). The IASB speaks about a faithful representation of information (F.36-37). If information is not reliable the users of this information are not able to use this information to make the best decisions.

Uncertainties and the use of estimates affect the reliability of information negatively. Information about risks, and especially forward-looking information, is however based on a lot of estimates and uncertainties, which would make the information less reliable and therefore useable. To increase the reliability and quality of information it is important to disclose the methods and assumptions used in certain analysis, for instance a sensitivity analysis (see the quantity framework). Another way to increase the reliability of information is by letting an auditor express an opinion on it. According to the IASB risk disclosures about financial instruments should be part of the financial statement, but incorporated in other statements that are available at the same terms and time is also allowed when cross-references are made (IFRS 7 BC45-46). For readers it might however be difficult to distinguish which information is audited

and which is not. Therefore auditing risk information and disclosing this will increase the reliability.

In the disclosure framework the following item is included that is related to reliability:

• Audit by independent auditor of risk information

5.3.2.4. Understandability

The annual report should be prepared in a way that it is understandable. The question is however for whom the disclosed information should be understandable. According to the conceptual framework of the IASB this should be for "users who have a reasonable knowledge of business and economic activities and accounting and who are willing to study the information diligently" (F.25).
Research by Linsley and Lawrence (2007) shows that risk disclosures are (very) difficult to read and that disclosing more information will not *per se* result in improved communication, "unless directors write with greater clarity when discussing risks" (2007, 625). Derived from the explanation of understandability by the IASB, a way of making difficult risk information more understandable is by explaining the reader what the bank understands by a specific type of risk and by giving an explanation of the methods that a bank uses to measure risks. In order to provide even a better understanding of the measurement methods an explanation of the limitations can be given. This provides the reader with more knowledge about how information should be interpreted and how banks interpret the information. Next to that, information might become more understandable for many users when not only qualitative information on a topic is given, but also quantitative information in the format of a table or graph to support the text. In the context of risk disclosures the use of graphics could in according to Ibrekk and Morgan (1987) increase the understandability of the information.

In the disclosure framework the following items are included that are related to understandability:

• Use of tables and graphs to support the text
• Definitions of types of risk
• Definitions of measurement methods used
• Explanation of limitations of measurement methods used

5.4.   Limitations frameworks

The developed frameworks that can be used to measure the quantity and 'quality' of risk disclosures do not pretend to be the best research methods and frameworks. In the context of this research they however help to overcome certain limitations of other content analysis approaches and frameworks as used in previous research.
A limitation of the quantity framework is that only a limited amount of selected items are included that are based on IFRS 7 and three types of risks of financial instruments. Other types of risk and possible other disclosures are thereby ignored. Concerning the quality framework a major limitation is the lack of scientific evidence that can support the items that are theoretically

expected to contribute to qualitative better risk disclosures, as valued by the users of the annual reports of banks (and more specifically the users of risk information).

Despite that these frameworks have their limitations they do provide a basis for future research.

5.5.   *Difference quantity/quality and quantitative/qualitative information*

In order to avoid confusion between the quantity/quality of information and quantitative/qualitative information, a brief explanation of what is exactly meant by this is desirable.

The quantity of information can be measured in several ways, but in fact it about '*how much*' is disclosed. In this study it is measured by counting on how many items included in the disclosure framework a bank has scored. It is assumed that the higher the score, the higher the quantity of information. Another possibility is to count the number of words, sentences, paragraphs or pages that includes risk information. The quality of information is a different and more difficult story. Considering the fact that section 5.3.1. already explained what is meant by quality this will not be repeated in this section.

According to Babbie (2007, 23) the "difference between quantitative and qualitative data is the distinction between numerical and non-numerical data". Qualitative risk information can be a statement like '*our market risk exposure has increased this year'*, while quantitative risk information is in numerical form and "makes it easier to aggregate, compare and summarize data" (Babbie, 2007, 23). An example of a quantitative disclosure in **figure 6**, in which credit risk exposures of Deutsche Bank are broken down into several categories and sectors.

Credit risk profile by industry sector	Loans[1]		Irrevocable lending commitments[2]		Contingent liabilities		OTC derivatives[3]		Total	
in € m.	Dec 31, 2008	Dec 31, 2007	Dec 31, 2008	Dec 31, 2007	Dec 31, 2008	Dec 31, 2007	Dec 31, 2008	Dec 31, 2007	Dec 31, 2008	Dec 31, 2007
Banks and insurance	26,998	12,850	24,970	28,286	11,568	11,005	68,641	36,048	132,177	88,189
Manufacturing	19,043	16,067	24,889	24,271	13,669	11,508	4,550	3,537	62,151	55,383
Households	83,376	70,863	3,862	3,784	1,768	1,724	791	1,497	89,797	77,867
Public sector	9,972	5,086	819	1,023	628	888	7,125	5,493	18,544	12,490
Wholesale and retail trade	11,761	8,916	6,377	5,840	3,423	3,496	1,264	839	22,825	19,090
Commercial real estate activities	27,083	16,476	2,239	3,144	2,403	1,902	3,213	455	34,938	21,977
Other[4,5]	92,986	70,339	40,921	62,162	15,356	19,383	38,006	24,134	187,269	176,018
Total	271,219	200,597	104,077	128,511	48,815	49,905	123,590	72,002	547,701	451,015

1 Includes impaired loans amounting to € 3.7 billion as of December 31, 2008 and € 2.6 billion as of December 31, 2007.
2 Includes irrevocable lending commitments related to consumer credit exposure of € 2.8 billion as of December 31, 2008 and € 2.7 billion as of December 31, 2007.
3 Includes the effect of master agreement netting and cash collateral received where applicable.
4 Loan exposures for Other include lease financing.
5 Included in the category "Other" is investment counseling and administration exposure of € 67.9 billion and € 54.8 billion as of December 31, 2008 and December 31, 2007, respectively.

Figure 6 Example quantitative risk disclosure of credit risk
Source: Annual report Deutsche Bank (2008, 76)

5.6.   *Risk disclosures scores*

The frameworks as explained in the previous sections show that for every disclosed item an annual report can score one point. Based on the number of items in the framework that are applicable to the annual report of a bank a maximum amount of points can be scored. The

maximum score can therefore differ per bank, since not all items in the framework have to be relevant for every bank and every year and should therefore not always be taken into account.

The quantity and quality of disclosures can be measured by calculating a score for every annual report. The following formula will be applied for this:

$$DSCORE_{BY} = \frac{1}{MAX_{BY}} \sum_{i=1}^{n} SCORE_{iBY}$$

DSCORE$_{BY}$ =   the disclosure score for bank B in year Y
MAX$_{BY}$ =   the maximum possible score for bank B in year Y
i =   the item in the framework
SCORE$_{iBY}$ =   the score for item I, bank B in year Y

The disclosure score can be calculated by applying this formula and dividing the sum of the scores of all items of bank B by the maximum score bank B could score. The result will be a score between 0 and 1. If for example the number of items in the framework is 30, and therefore the maximum score as well, and in the annual report of bank B 25 items are disclosed the disclosure score for bank B in year Y is 25/30 = 0,833. After calculating all the scores these can be compared with each other since the scores are scaled.

6. Empirical research

6.1. Introduction

After developing risk disclosure frameworks that can be used to measure the quantity and quality of risk disclosures in the area of credit, market and liquidity risk, these can be applied to the annual reports of banks. Due to the limitation of time it is however impossible to examine all the banks and all their annual reports in this empirical research. Section 6.2. therefore describes which banks are included in the sample and which annual reports will be examined. An explanation on how the disclosure scores can thereafter be calculated will be given in section 6.3. The results of the empirical research are finally shown in section 6.4., and some remarks in section 6.5.

6.2. Sample size and selection of years

The sample in this study consists of 32 annual reports of the period 2005-2008 of 8 German banks. Section 2.5.1. elaborated on the German banking industry and explained that there are many banks and different types of banks in Germany. Considering the fact that Germany is also a forerunner when it comes to regulation of risk reporting, it is interesting to examine the quantity and quality of risk disclosures in the annual reports of German banks.

In order to select a sample for this research a list of all the German banks was retrieved from the database Bankscope. This resulted in a number of 1862 banks, including all the types of banks as discussed in section 2.5. According to the German Bundesbank there are however at the end of 2008 in total 1980 credit institutions, but no list of the names of them is available. Since availability of English annual reports is an important condition another list of banks was retrieved from the KPMG annual reports database. In total 37 banks published their annual report of the past four years in English; a list of these banks is included in **appendix VIII.**

The banks in the sample are first of all selected based on the availability of the English annual report. Second, a number of eight banks are more or less at random selected, thereby do taking into account differences in size and stock-listing (listed or not). In total 4 stock-listed and 4 not stock-listed are selected and both large and smaller size banks. The result of this is however that no general statements about the German banking industry can be made, since not every bank will be examined. The selected banks in the sample are included in **table 3.**

Commerzbank*	Hypovereinsbank
DekaBank Deutsche Girozentrale	KfW Bankengruppe
Deutsche Bank*	LandesBank Berlin Holding*
Deutsche Postbank*	WestLB

* stock-listed in Germany and/or abroad

Table 3 Banks included in sample

For the selected banks the annual reports of the years 2005-2008 will be examined, which will finally result in a number of 32 observations. The rationale behind selecting these years is due to the fact that from January 1, 2005 stock-listed companies in the European Union have to report in conformity with IFRS and from January 1, 2006 banks in general as well. Mandatory risk disclosures are required from January 1, 2007 due to IFRS 7 and by selecting the years 2005-2008 two years before and two years after the mandatory requirements of IFRS 7 are examined. The results are expected to show an increase in risk disclosures over time, which is in accordance with general trends but might also be an effect of the introduction of IFRS 7. Since time is an important limitation in this study, examining more than four years is however not feasible.

6.3.   *Reliability and validity*

The inevitable subjectivity of content analysis and the disclosure index frameworks have an effect on the reliability of the results and the validation of the frameworks.

Validation of the frameworks items is based on the literature; mainly IFRS 7 for the quantitative framework and the IASB framework for the qualitative framework. Discussions with different professionals (e.g. bank managers, auditors, analysts) to validate the frameworks are considered, but not carried out due to the limitation of time and the question whether this will result in response that is representative for the whole group of users of the annual reports. Next to that there will probably not be consensus between the groups of users, since they all have different intentions with the information. Since the IASB represents all the users of the annual reports and IFRS 7 and the qualitative characteristics of information are drawn up by this board, the frameworks that are derived from this implicitly take into account the information needs of the users.

As mentioned in section 4.4. Krippendorf (2004) distinguishes stability, reproducibility and accuracy as types of reliability. Even though a single-coder approach is adopted in this study the reliability of the results can be increased.
Stability of coding refers to a consistent coding process over time by the same coder (Jones and Shoemaker, 1994). In this study the same person coded every annual report and verified them after coding all the annual reports, which will according to Guthrie et al. (2004) enhance the consistency of analysis. In order to increase the reliability even more a different coder, which is also involved in examining risk disclosures of financial instruments, has coded one annual report of the sample. The results are compared and show that both coders have applied the framework consistently. Discussing how to code the annual reports before the actual coding has contributed to this. The reliability of the results is hereby increased, although some uncertainty always remains. This is therefore one of the major limitations of this research.

6.4.   *Disclosure results*

Applying the disclosure frameworks to the annual reports of the banks included in the sample resulted in the disclosure scores on year level as presented in **tables 4** and **5**. The unweighted averages of the sample are given for the years 2005-2008 and show that both the quantity and 'quality' increased over time. The figures for every bank are included in **tables 13** and **14** in **appendix IX** and show that on the level of individual banks the scores have also increased over

time, but that there are still differences between banks. Since the focus of this study is on the industry itself and not on certain banks in particular, these results will not be discussed on bank level.

The minimum score for quantity in 2005 was 0,29, far below the average of 0,62 and the maximum score of 0,78 for that year. In the years 2006-2008 the mean, minimum and maximum score all increased, with the maximum score in 2007 and 2008 staying equal at 0,95. Over the years, the standard deviation decreased, which indicates that the differences in disclosure scores between banks have become smaller. The question is however what might cause these differences between disclosures of banks, since the regulation and disclosure requirements are (almost) the same. Section 6 will analyze the differences and elaborate on this.

	2005	2006	2007	2008
Mean	0,62	0,66	0,83	0,87
Min	0,29	0,41	0,75	0,81
Max	0,78	0,81	0,95	0,95
Stand.dev.	0,16	0,13	0,07	0,05

Table 4 Disclosure scores quantity per year

In the case of quality the disclosure scores are on average higher than for quantity. The minimum score of 0,50 was achieved in 2005, when the average score was 0,75 and the maximum score 0,92. Over the years the average score has increased and the maximum score of 1,00 was achieved in the years 2007 and 2008. For quality as well the differences in disclosure scores have become smaller. The main question is however what the relation between the quantity and quality scores is. Do banks that disclose more items, and therefore also contribute to the quality of the risk information, also provide a higher quality annual report based on other qualitative characteristics? Section 6 will elaborate on this.

	2005	2006	2007	2008
Mean	0,75	0,78	0,89	0,90
Min	0,50	0,67	0,85	0,85
Max	0,92	0,83	1,00	1,00
Stand.dev.	0,12	0,06	0,07	0,05

Table 5 Disclosure scores quality per year

6.5. Other remarks

When reading the annual reports of the banks included in the sample the following also stroke the researcher in general:

- Every examined annual report for every bank has a separate risk report in the management report which includes most of the risk information but not all. In certain cases the notes to the financial statements also included a risk report, but some information from the management report was repeated in here. In almost every case however the risk report in the management report was also audited by the independent auditor, increasing the reliability of the risk information.
- The presentation of risk information and the methods to measure the risks differ per bank. Over the years, the banks are however rather consistent in their presentation and measurement methods. Between banks it is however difficult to compare the information since the confidence intervals (e.g. 95%, 99%, 99,7%) and the models used to calculate the Value-at-Risk (e.g. Monte Carlo, variance-covariance) differ. Next to that not every bank splits the VaR for every type of market risk, making it difficult to compare for instance the interest rate risk between banks.
- According to the annual reports the methods to measure risks have improved over the years. Mainly the parameters of the models have changed, which improved the outcomes of the risk calculations. Mainly in the last two years, 2007 and 2008, the measurement methods are improved due to more extreme conditions in the financial markets and the new insights that are gained by this.
- Although the requirements of Basel II are mandatory since January 1, 2008 the banks already discuss in the years 2005-2007 how they are adapting their measurement methods to the new requirements.
- Every German bank in the sample discloses that they perform stress tests in all the examined years, but the extent of information on this however varies with some banks only noticing that they perform those tests and other banks for instance also explaining how much extra capital they need in the case of extreme conditions.
- When reading the risk reports the quantity of information has visibly increased, although the reports in 2005 and 2006 were already rather extensive. Over the years the text per bank looks a lot like each other and mostly text is added to it instead of changed with respect to the content.
- In the year 2008 the IASB amended IFRS 7 due to the political pressure and the lobbying of German and French banks. The amendments now make it possible to classify former equities available for sale or held for trading as loans and receivables (Dekker, 2009). For the valuation this means a shift from fair value, which is due to the financial crisis almost zero in many cases, to amortized costs. Disclosures of the reclassification are however mandatory and of the 8 examined banks 7 of them disclose that they reclassified certain financial instruments. The mandatory disclosures are all given in the notes to the financial statements and include the effects on the 2008 results.

7. Analysis

7.1. Introduction

The previous section shows that different disclosure scores are the result of applying the frameworks to the annual reports included in the sample. Since not all the banks are equal to each other, for instance when it comes to size, it is interesting to examine the differences in scores and the relationship between the quantity and quality scores, the scores and firm-specific characteristics, and whether the scores have significantly increased over time. Therefore hypotheses are drawn up in section 7.2. that might help to explain the differences in scores. Section 7.3. explains how firm-specific characteristics will be measured in this study and section 7.4. explains the statistical methods that will be applied to the data. In section 7.5 the descriptive statistics are presented and section 7.6. contains the analysis of the results.

7.2. Hypotheses

In order to find possible explanations for the differences in disclosure scores a limited amount of hypotheses is developed that will test the relationship between quantity and quality scores, with certain firm-specific characteristics, and with time. The hypotheses and the logical basis for the development of it are explained below. Due to the limited amount of research on this specific topic these hypotheses are mostly based on general risk disclosure studies and the theory as explained in section 3.

7.2.1. Quantity versus quality

An important contribution to the already existing accounting literature on disclosures can be provided by examining the relationship between the quantity and quality of risk disclosures. As explained in previous sections, certain researchers assume that quantity is a good proxy for the quality as well, but no clear explanation for this has been given. Other researchers state that this relationship cannot just be assumed and a study by Beretta and Bozzolan (2008) on forward-looking information shows as well that the quality of disclosures is not related to the quantity of disclosures.

In this study quantity is measured by the quantity framework (**appendix VI**), and quality by the quality framework (**appendix VII**). To a certain extent the quantity framework measures quality as well, by including items related to relevance, but the quality framework also takes into account comparability, understandability and reliability of information. In order to examine what the relationship between the quantity and quality of risk disclosures in the banking sector is the hypothesis below is drawn up. There is however no clear theoretical background for the expectation that banks that disclose a lot of information do not automatically also provide information of better quality.

> **H1:** *Banks with high quantity scores do not have high scores on the quality items*

7.2.2. Risk disclosures and bank size

The second set of hypotheses to be tested focuses on the relationship between risk disclosures and the size of banks. In general, larger companies attract more attention of share- and stakeholders than smaller companies. According to the Political Cost Theory this might lead to higher political cost and one way of reducing these costs is to disclose more information, for instance about risks. Also the problems of information asymmetry, agency costs and higher demand of returns for shareholders will be higher for larger companies. In accordance with Diamond and Verrechia (1991, 1325) larger companies and banks are therefore expected to disclose more risk information.

Previous studies have found a positive relationship between the level of risk disclosures and the size of non-financial companies in *inter alia* the UK, Italy and Malaysia. Linsley et al., (2006) however also found this positive relationship for UK and Canadian banks when examining a total amount of 18 annual reports in 2002. The rationale for this relationship would be that stakeholders "have an expectation that larger banks should be providing more disclosures or have more varied information needs and consequently larger banks may be responding to this expectation or need" (274). On the other hand, institutional isomorphism, as described by DiMaggio and Powell (1983), suggests that financial firms imitate each other in their risk disclosures (Linsley et al., 2006, 279) and also according to Cooke (1992) the behavior of a dominant company may shape the disclosures within an industry.

Based on the political cost theory one can expect to find a positive relationship between bank size and the quantity of disclosures. However, only in the years before the disclosures of IFRS 7 became mandatory (2005-2006). In the years 2007-2008 no significant relationship is expected since the disclosure requirements are in this period equal for all banks.
The relationships between the quantity of disclosures and bank size will be examined by testing the following hypotheses:

> **H2a:** *There is a significant positive relationship between the quantity of risk disclosures in the annual reports of German banks and bank size in the period 2005-2006*

> **H2b:** *There is no significant positive relationship between the quantity of risk disclosures in the annual reports of German banks and bank size in the period 2007-2008*

For examining the relationship between the quality of risk disclosures and bank size the hypotheses below are drawn up. It is expected that larger banks produce qualitative better annual reports since they have more political exposure and in general more stakeholders that make use of the annual report. A positive relationship is expected for both the periods (2005-2006 and 2007-2008).

> **H2c:** *There is a significant positive relationship between the quality of risk disclosures in the annual reports of German banks and bank size in the period 2005-2006*

> **H2d:** *There is a significant positive relationship between the quality of risk disclosures in the annual reports of German banks and bank size in the period 2007-2008*

7.2.3.. Risk disclosures and profitability

The fact that a bank might be larger, for instance based on total assets, does not necessarily have to mean that a bank is also more profitable. The question for this research is therefore what the relationship between risk disclosures and bank profitability is. According to Helbok and Wagner (2006a, 11) banks that are more profitable will be early adopters of risk disclosures since they want to distinguish themselves from the other, less profitable banks. Next to that, the political cost theory also gives rise to the expectation that more profitable banks will disclose more risk information in order to reduce the political costs. Whether risk disclosures lead to higher profitability or higher profitability leads to more risk and better risk disclosures is however not the relationship that will be examined in this research.

Previous empirical research on operational risk disclosures by Helbok and Wagner (2006b) shows a negative relationship between operational risk disclosures by banks and their profitability level as measured by the net profit divided by total assets. In contrast with their expectation, Linsley et al. (2006) do not find a significant positive relationship between the quantity of risk disclosures by banks and the relative profitability. In general mixed results are found[18], but in accordance with the theory and expectation that by risk disclosures banks can show the users of the annual report that they manage their risks well, the following hypothesis is drawn up for the years 2005-2006:

> **H3a:** *There is a significant positive relationship between the quantity of risk disclosures in the annual reports of German banks and the relative profitability of the banks in the period 2005-2006*

Since the disclosure requirements became equal for every bank in the years 2007-2008 differences that are related to the profitability of a bank are not expected and therefore the following hypothesis is drawn up for the years 2007-2008:

> **H3b:** *There is no significant positive relationship between the quantity of risk disclosures in the annual reports of German banks and the relative profitability of the banks in the period 2007-2008*

Concerning the relationship between the quality of risk disclosures and bank profitability the following hypotheses are drawn up, for the same reasons as mentioned for hypotheses 2c and 2d.

> **H3c:** *There is a significant positive relationship between the quality of risk disclosures in the annual reports of German banks and the relative profitability of the banks in the period 2005-2006*

> **H3d:** *There is a significant positive relationship between the quality of risk disclosures in the annual report of German banks and the relative profitability of the banks in the period 2007-2008*

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[18] See Ahmed and Courtis. 1999. Associations between corporate disclosure characteristics and disclosure levels in annual reports: A meta-analysis, *British Accounting Review* 31: 35-61.

7.2.4. Risk disclosures and time

In previous research by Kajüter and Winkler (2003) a positive relationship between the quality of risk disclosures in the German annual reports of 1999-2001 of non-financial stock listed companies and time was found. This result is consistent with the increase in demand of risk disclosures and the general trend that is observed in the disclosures of banks (Linsley and Shrives, 2005, 210). The results of the empirical research of German banks' annual reports, as discussed in section 6, also shows at first sight an increase in the quantity and quality of risk disclosures. The expectation is therefore that between the periods 2005-2006 and 2007-2008 both the quantity and quality of risk disclosures in the annual reports of banks have increased significantly and in order to test this relationship the following hypotheses are drawn up:

> **H4a:** *The quantity of risk disclosures in the annual reports of German banks has increased significantly between the period 2005-2006 and 2007-2008*

> **H4b:** *The quality of risk disclosures in the annual reports of German banks has increased significantly in the period 2005-2006 and 2007-2008*

7.3. Measurement of variables

7.3.1. Bank size

In order to calculate the correlation between bank size and disclosure scores, the measurement of the variable bank size has to be determined. Previous studies on disclosures by non-financial companies, for example by Botosan (1997), consider the market value of equity at year end to be a good measure of company size. However, other measurements as turnover, total assets, and the number of employees can also be used to measure the size of a company. Hackston and Milne (1996, 87) state that "no theoretical reasons exist for a particular measure of size", and therefore they measure size in their study by market capitalization, sales and total assets. Whether these measures are also appropriate for measuring bank size is the question. According to Linsley et al. (2006, 275) turnover cannot be considered to be an appropriate measure since banks "do not derive profit from sales in the same way that the profits of say, a manufacturing company derive from sales".

Total assets and market capitalization are used in the study by Linsley et al. (2006), but since not all the banks included in the sample of this research are stock-listed market capitalization cannot be used. Therefore bank size will in this research be measured by total assets, and in order to prevent heteroscedasticity by taking the *natural logarithm of total assets*.

Tables 15 and **16** in **appendix IX** provide an overview of the total assets over the years for the banks included in the sample.

7.3.2. Profitability

The variable profitability can be measured in several ways, especially since both absolute and relative profitability can be distinguished. In the case of relative profitability financial ratios are calculated, which make it easier to compare performances between companies and over time. In the case of bank performances the Return on (Average) Total Assets (ROA) and Return on (Average) Equity (ROE) are often calculated. Previous studies by Helbok and Wagner (2006b) and Linsley et al. (2006) examined the relationship between disclosures and profitability of banks, thereby measuring profitability by the net profits divided by total assets (ROA). Another measurement that is often reported as a key performance indicator in the annual reports of banks is the ROE, which is the division of net profits by shareholders equity. In order to examine the relationship between bank profitability and risk disclosures by German banks, profitability will therefore be measured by both the ROA and ROE, both with the denominator based on a year's average total assets or equity.

Tables 17 and **19** in **appendix IX** provide an overview of the ROAA[19] and ROAE[20] over the years for the banks included in the sample.

7.4. Statistical methods

In order to determine the statistical method to be applied in this research, examination of whether the data is normally distributed is a first necessary step. The results, which are obtained from PSAW 17.0, are disclosed by QQ-plots in **appendix X.** When the results are approximately linear these are normally distributed and parametric tests can be applied to the data. The results show that there is an outlier for the ROAA and ROAE in the year 2007[21]. To increase the reliability of the results of the statistical analysis this outlier is excluded from the sample when testing the third hypothesis.

Due to the normal distribution of the variables (by excluding outliers in 2007) parametric tests can be applied to all the hypotheses. For hypotheses 1-3 Pearson correlation coefficients will be calculated and by this the following hypothesis will be tested at a 95 % confidence level:

H0: there is no significant correlation between variables X and Y (α = 0,05)

For the fourth hypotheses a paired samples t-test will be used. The average disclosure scores of the years 2005-2006 and 2007-2008 for every bank are calculated and these results will be pair-wise compared to each other. The following hypothesis will be tested by this, again at a 95% confidence level:

H0: the means of the two groups (2005-2006 and 2007-2008) are equal to each other

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[19] Return on Average Assets
[20] Return on Average Equity
[21] KfW Bankengruppe 2007

7.5. Descriptive statistics

The descriptive statistics of the variables Quantity scores and Quality scores are shown on year level in **tables 4** and **5** in section 6.4. For the third part of this research the variables LN of Total Assets, ROAA and ROAE are however also taken into account. For these variables **table 6** below shows the minimum, maximum, mean and standard deviation, taking into account all the data.

In total 32 annual reports of 8 different banks are examined resulting in disclosure scores for quantity between 0,29 and 0,95 and for quality between 0,50 and 1,00. On average the disclosure score for quantity is 0,75 and for quality 0,83, with the scores in the years 2005-2006 mostly below this average and 2007-2008 above this average.
The size of the bank, as measured by the natural logarithm of total assets, is between 11,56 (corresponding with an amount of total assets of 104.928 mln EUR) and 14,61 (corresponding with an amount of total assets of 2.202.423 mln EUR). For most of the banks the amount of total assets increased over the years, for the bank's profitability this is however not the case. The minimum return on (average) assets is -1,80 and the maximum 1,30. For the return on (average) equity these numbers are -39,00 and 28,70. The negative returns are all achieved in the years 2007 and 2008, when the financial crisis had a big impact on almost every bank. Therefore for the analysis it is important to exclude possible outliers, since they can have a significant effect on the results.

	N	Minimum	Maximum	Mean	Std. Deviation
Quantity	32	0.29	0.95	0.7459	0.15185
Quality	32	0.50	1.00	0.8325	0.10223
LnTA	32	11.56	14.61	12.7047	0.82584
ROAA	32	-1.80	1.30	0.1469	0.52608
ROAE	32	-39.00	28.70	5.9219	15.17278

Table 6 Descriptive statistics

All the results of the statistical analysis are included in **appendix X**. Part A gives the results of the Pearson correlations including all the data, part B without an outlier, part C without possible outliers and part D gives the results of the paired-samples t-test.

7.6. Conclusions analysis

Applying the statistical methods as explained in section 7.4. resulted in the Pearson correlation coefficients as presented in **table 7**. The results will be discussed per set of hypotheses.

Hypothesis 1
The result of testing the first hypothesis about the quantity and quality of disclosures shows that there exists a significant positive relationship (at a confidence interval of 99%), as opposed to the expectation of no significant correlation. This can be interpreted as banks that disclose more items based on the quantity framework apparently also provide information of higher quality, for instance by (voluntary) disclosing information in a specific way (e.g. including graphs and

tables, providing comparable figures of previous year). Since most of the banks score high on quality it is possible that banks imitate each other.

The positive relationship between quantity and quality was already assumed by other researchers, but the results of this research provide more evidence for their statements. Because of these results examining the relationships between quality and bank size, profitability, and time seems redundant. They will therefore not be discussed explicitly.

Hypotheses 2a-d

The second set of hypotheses is drawn up to examine the relationship between disclosures and bank size. In the period 2005-2006 a significant positive relationship for quantity and in the periods 2005-2006 and 2007-2008 a significant positive relationship for quality is expected, based on the political cost theory and the bigger problems of information asymmetry and agency costs for larger banks. The results however show for both quantity and quality very small positive relationships, which are not significant at all at the 5 % level of significance. For 2007-2008 significant positive relationships with bank size are shown, as opposed to the expectation of no significant relationship with the quantity of disclosures.

An explanation for the unexpected result in the period 2007-2008 might be the influence of the German disclosure requirements of GAS 5-10. As explained before Germany is a forerunner when it comes to the regulation of risk reporting and due to the fact that GAS 5-10 was already mandatory for several years the risk disclosures of banks have apparently become more similar. Institutional isomorphism or the influence of a large, dominant bank might also be explanation, but cannot be tested with the obtained results.

The quantity results of period 2007-2008 are more surprising and are difficult to explain by the theory or by the introduction of regulation. A possible explanation might be that the differences between bank sizes have increased, due to for instance consolidation or the impact of the financial crisis. Some banks have been grown a lot, as measured by total assets, while others show a decrease in size. The disclosure scores itself have however become more equal, and therefore the results have to be interpreted with care.

The results in general, by taking into account all the data for all the years, do not show a significant positive relationship either and therefore no unambiguous conclusion can be drawn on whether the size of a bank is of significant influence of the risk disclosures in the annual report. It seems that because of mandatory disclosures this relationship that is found in other studies has disappeared.

Hypotheses 3a-d

In the period 2005-2006, the results of the statistical analysis implies that there is a small positive relationship, but not a significant one, between the quantity and quality of disclosures and the relative profitability of a bank, as measured by both the ROAA and ROAE. More profitable banks do not disclose more and better information, although this might be expected based on for instance the political cost theory and the signaling perspective as discussed in section 3.2. An explanation for this unexpected result might be the mandatory risk disclosure requirements of GAS 5-10, as explained above when discussing the relationship with bank size.

		Quantity All	Quality All	LnTA 05-06	LnTA 07-08	ROAA 05-06	ROAA 07-08	ROAE 05-06	ROAE 07-08
Quantity All	Pearson Correlation	1	0.820**						
	Sig. (2-tailed)		0.000						
	N	32	32						
Quality All	Pearson Correlation	0.820**	1						
	Sig. (2-tailed)	0.000							
	N	32	32						
Quantity 05-06	Pearson Correlation			0.097		0.078		0.231	
	Sig. (2-tailed)			0.720		0.773		0.390	
	N			16		16		16	
Quantity 07-08	Pearson Correlation				0.548*		-0.422		-0.343
	Sig. (2-tailed)				0.028		0.117		0.211
	N				16		15		15
Quality 05-06	Pearson Correlation			0.144		0.209		0.305	
	Sig. (2-tailed)			0.596		0.437		0.251	
	N			16		16		16	
Quality 07-08	Pearson Correlation				0.567*		0.106		0.142
	Sig. (2-tailed)				0.022		0.708		0.613
	N				16		15		15

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

Table 7 Pearson correlation coefficients

The results of the period 2007-2008 show an unexpected negative relationship with quantity, and a small positive relationship with quality. All the results are however not significant and can be interpreted differently since only the correlation is tested and not a causal relationship. It is therefore possible that more profitable banks disclose less than less profitable banks, or less profitable banks disclose more than more profitable banks. Since 2007 and 2008 were unusual years due to the financial crisis[22] it is difficult to interpret the results of these years. Especially since the disclosure scores for quantity and quality both increased over these years, whether the bank became more profitable or not.

The results that show that larger and more profitable banks do not disclose significantly more information might also be caused by the fact that risk information is commercially sensitive and involves a lot of uncertainty. Disclosing more than competitors will therefore give an advantage to them. Next to that, a lot of information needs to be disclosed in regulatory reports too and might therefore not be disclosed in the annual reports as well.

Hypotheses 4a-b
Over the years the disclosure scores were expected to increase and the paired samples t-test , as included in **table 30** in **appendix XI**, shows results of -3,757 and -3,603, with significance levels of 0,007 and 0,009 for quantity and quality. These results show that the means of the disclosure scores in 2007-2008 are significantly higher than in 2005-2006. In section 6.2.4. is stated that this was expected since the demand for risk disclosures has increased and a general trend of increasing disclosures was already observed. There are however other possible explanations for this observed increase. The introduction of IFRS 7, and to a less extent Basel II, might have had a major impact on disclosure scores since banks are from 2007 required to disclose the items as included in the quantity framework. The financial crisis on the other hand might also be of great influence, since the focus on banks and their risks has been increased greatly. By disclosing more information banks might want to avoid discussions and prevent reputation damage. Other literature already suggested that the amount of bad new disclosures will increase when a company's financial position is threatened (Darrough and Stoughton, 1999; Suijs, 2005), but according to Linsley et al. (2006, 279) banks rather do not discuss their risk levels publicly because of the previously mentioned costs. What has caused the increase in disclosures is therefore unambiguous, but the introduction of IFRS 7 remains according to the researcher the expected main driver of the significant increase in both the quantity and quality of disclosures. Other research of annual reports after the introduction of risk disclosure requirements (for instance after GAS 5) might back this expectation that accounting standards are of important influence on the risk disclosures.

Table 8 presents a summary of the hypotheses, expectations and outcomes as described in section 6.

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[22] For the first time in the period 2005-2008 the ROAA and ROAE show negative results for some banks in 2007 and for even more banks in 2008

7.7. Limitations and future research

As mentioned in the introduction a major limitation of this research is subjectivity. Next to that, only a sample of the German banks is examined which makes it not possible to make statements about the whole banking industry, not in Germany and not about the banking industry in general. Another limitation is the time, which did not make it possible to examine the effects of the introduction of IFRS 7 and the financial crisis on the risk disclosures by banks more extensively. In the future an event study might therefore be done that is able to provide more information to support the results and expectations of this research.

Based on this research a number of other studies are possible. For instance whether the capital market becomes more efficient and the cost of capital declines due to increased risk disclosures. Also a behavioral study can be done to examine whether increased risk disclosures will also lead to better decisions and judgments of the users of the annual reports. Based on that kind of study the quality framework might also be expanded with a list of other items that are related to the qualitative characteristics of information.

In conclusion, this research is relevant for future research since it provides evidence about the development of risk disclosures in the banking sector which might be explained by a number of other factors and/or have an effect on the decision making of annual report users. The given future research opportunities as given in this section are however not limited.

Hypotheses	Expected outcome	Outcome
H1: *Banks with high quantity scores do not have high scores on the quality items*	Not significant positive	Significant positive (0,01 level)
H2a: *There is a significant positive relationship between the quantity of risk disclosures in the annual reports of German banks and bank size in the period 2005-2006*	Significant positive	Small positive, not significant
H2b: *There is no significant positive relationship between the quantity of risk disclosures in the annual reports of German banks and bank size in the period 2007-2008*	Not significant positive	Significant positive (0,05 level)
H2c: *There is a significant positive relationship between the quality of risk disclosures in the annual reports of German banks and bank size in the period 2005-2006*	Significant positive	Small positive, not significant
H2d: *There is a significant positive relationship between the quality of risk disclosures in the annual reports of German banks and bank size in the period 2007-2008*	Significant positive	Significant positive (0,05 level)
H3a: *There is a significant positive relationship between the quantity of risk disclosures in the annual reports of German banks and the relative profitability of the banks in the period 2005-2006*	Significant positive	Small positive, not significant
H3b: *There is no significant positive relationship between the quantity of risk disclosures in the annual reports of German banks and the relative profitability of the banks in the period 2007-2008*	Not significant positive	Negative, not significant
H3c: *There is a significant positive relationship between the quality of risk disclosures in the annual reports of German banks and the relative profitability of the banks in the period 2005-2006*	Significant positive	Small positive, not significant
H3d: *There is a significant positive relationship between the quality of risk disclosures in the annual report of German banks and the relative profitability of the banks in the period 2007-2008*	Significant positive	Small positive, not significant
H4a: *The quantity of risk disclosures in the annual reports of German banks has increased significantly between the period 2005-2006 and 2007-2008*	Significant increase	Significant increase (0,01 level)
H4b: *The quality of risk disclosures in the annual reports of German banks has increased significantly in the period 2005-2006 and 2007-2008*	Significant increase	Significant increase (0,01 level)

Table 8 Summary outcomes

8. Summary

Since the existence of banks these are known to be major risk taking and risk management entities. The recent financial crisis however resulted in an increased attention on risk disclosures of financial instruments in the annual reports of banks, as was also the case for risk disclosures in general after the major corporate scandals in the past years. Until now not many empirical research on risk disclosures in the banking sector has however been taken place and therefore it is interesting to examine whether there are differences in the quantity and quality of financial instrument risk disclosures in the annual reports of banks, what the relationship with the size and profitability of a bank is, and whether the disclosures have increased in the period 2005-2008. Since Germany has an important and unique banking industry where corporate governance plays a large role, the empirical research of this study focuses on a sample of eight German banks. A theoretical background for this study is however provided first.

The modern view of risk is nowadays viewed as "uncertainty as to the amount of benefits" and "includes both potential for gain and exposure to loss" (ICAEW, 1998, 5). As a consequence, risk disclosures are according to Beretta and Bozzolan (2004, 269) "the communication of factors that have the potential to affect future results". The development of risk reporting started around the '90s when, among others, standard setters started issuing reports on this topic (Cadbury report, 1992; AICPA, 1995; ICAEW, 1997, 1999, 2002; Turnbull Report, 1999). In Germany specific, legislation incorporated mandatory risk disclosures since 1998, when the German Commercial Code was amended due to the Law on Corporate Control and Transparency. In 2001 the world's first accounting standard that required comprehensive risk disclosures, GAS 5 and GAS 5-10 for financial institutions, became legislative. Following the German changes in the corporate law, the Modernization Directive of the EU resulted in including risk reporting in the national laws of EU member states since 2005. More recently, IFRS 7 (2007) and Basel II (2008) require comprehensive risk disclosures of the risks of financial instruments, which are by IFRS 7 defined as credit risk, liquidity risk, and market risk, with the latter subdivided into interest rate, currency and other price risk.

There are many reasons why companies report or should report about their risks. Information asymmetry, the agency problem, the information risk perspective, the political cost theory, and the signaling perspective all provide reasons for why a manager or company will or will not report about risks. Advantages of risk reporting are among others improved risk management, better decision making by shareholders, a lower cost of capital, improved accountability for stewardship and less attention by supervisors. Managers might however be reluctant to release risk information for two reasons: the problem of proprietary information and the issue of forward looking information.

Previous research on risk disclosures mostly focused on non-financial firms and voluntary disclosures (e.g. Beretta and Bozzolan, 2004; Linsley and Shrives, 2006; Abraham and Cox, 2007). Research on risk disclosures by banks are only recently conducted in a limited amount and examine for instance the relationship between the quantity of risk disclosures and firm-specific characteristics as bank size and profitability level (Basel, 2001, 2002, 2003; Linsley et al., 2006; Helbok and Wagner, 2006; best practice studies by audit firms). Several types of content analysis are used as research methods. For instance the disclosure index study that makes use of a coding scheme with pre-specified items that makes it able to check the text in

annual reports on the presence or absence of these items and make statements about the quantity of disclosures. According to certain researchers (Marston and Shrives, 1991; Zarzeski,1996) the quantity of information is however a good proxy for the quality and therefore do not develop a method to measure the quality of risk information as well. Neither do Linsley et al. (2006), who measure risk disclosures by counting the number of sentences with certain characteristics and examine relationships with firm-specific characteristics based on these outcomes.

For this research a disclosure index study is used, and in order to be able to measure both the quantity and quality of risk disclosures two disclosure frameworks are constructed. The quantity framework, that measures to some extent quality as well by incorporating relevant items, is based on the disclosure requirements of IFRS 7 for market, credit and liquidity risk, and the quality framework takes into account a limited amount of items that are related to the qualitative characteristics of information as defined by the IASB: relevance, understandability, reliability, and comparability.

In order to examine differences in risk disclosures and possible relationships with other variables in the German banking sector, both the frameworks are applied to a sample of 32 annual reports. The 2005-2008 annual reports of eight banks, that differ in size and ownership, are examined with the rationale behind this that in this case two pre (2005-2006) and two post (2007-2008) IFRS 7 years are selected. A major limitation of this method, and content analysis in general, is however the subjectivity. In order to remove some of this the frameworks are validated and the reliability of the outcomes is increased by checking the stability of the coding by the same researcher and by a different researcher.

Checking the text on the presence of the items as specified in the frameworks resulted in a number of items that is disclosed in every annual report. Since not all the items are applicable to every bank and in every year, the results are scaled by calculating disclosure scores. These scores are calculated by dividing the number of disclosed items by the maximum number of items that is relevant for a specific annual report and result in scores between 0 (no disclosure at all) and 1 (full disclose based on the framework).

The minimum disclosure score for quantity is 0,29 and was achieved in 2005, the maximum score is 0,95 and was achieved in 2008. For quality the minimum and maximum scores are 0,50 (2005) and 1,00 (2007, 2008). The unweighted average disclosure scores for both quantity and quality increased over the years and the differences between banks became smaller. The question is however what might cause these differences between disclosures, since the regulation and disclosure requirements are (almost) the same for every bank. Next to that, the close results of quantity and quality make it interesting to examine whether quantity can be seen as a good proxy for quality in this research as well, and the increasing scores make one question whether these have increased significantly between the pre and post IFRS 7 period. In order to examine this hypotheses are drawn up and statistical methods have been applied to the data. The results of this will be discussed below.

Other remarks can however also be made. For instance every examined annual report includes a separate risk report, but the presentation of risk information and methods to measure the risks differ per bank. The annual reports however mention that these methods have improved over the years, for instance by adapting them to the new Basel II requirements. A last thing to notice

is that 7 of the 8 examined banks disclose in the 2008 annual report that they have been reclassified former equities available for sale or held for trading as loans and receivables. Amendments of IFRS 7 in 2008 due to political pressure and the lobbying of German and French banks made this possible and the mandatory disclosures that relate to this by all the seven banks disclosed in the notes to the financial statement.

The main research question of this research is the following:

How can differences in the quantity and quality of financial instrument risk disclosures in the annual reports of German banks be measured and explained?

It is already explained that two new disclosure frameworks, that overcome certain limitations of other research, are developed and that applying them to the annual reports of banks resulted in different disclosure scores between years and banks. In order to answer the part of the main question about how these differences can be explained, the following four set of hypotheses are drawn up in order to examine (1) the relationship between the quantity and quality scores, (2) the relationship between the disclosure scores and bank size, (3) the relationship between the disclosure scores and profitability, and (4) whether the disclosures have significantly increased between the period before the introduction (2005-2006) and after the introduction of IFRS 7 (2007-2008).

After excluding an outlier and using PSAW 17.0 (former SPSS) to calculate the Pearson correlation and significance for the first three sets of hypotheses and a paired samples t-test for the fourth hypotheses, the following can be concluded.

The expectation that banks that disclosure more information do not necessarily have to provide better information is not supported by the result of the correlation between the quantity and quality scores over all the years. A significant positive relationship is found, which provides evidence for the statement of other researchers that quantity can be used a proxy for quality. For the rest of this research it therefore does not make a lot of sense to discuss both the results of quantity and quality separately.

The relationship of quantity and quality with bank size, as measured by the natural logarithm of total assets, was expected to be significant positive in the years 2005-2006 due to the political cost theory, information asymmetry problem, and the assumed higher agency costs for larger banks. The results however do not provide evidence for this at a 5% level of significance and might be explained by the already existing requirements of GAS 5-10, institutional isomorphism or the influence of a large, dominant bank on the disclosures in the entire industry. In the years 2007-2008 the significant relationship was expected to disappear since the requirements of IFRS 7 became mandatory and the quantity framework is based on this. The result of the Pearson correlation coefficient showed however a surprising significant positive relationship, possibly due to an increased difference in bank sizes and more equal disclosure scores. Taking the scores over the four years into account, no significant positive relationship is shown either.

A significant positive relationship between the disclosures and profitability, as measured by the ROAA and ROAE, was also expected in the period 2005-2006, based on the political cost theory and the believe that more profitable banks want to distinguish themselves from the less

profitable one by means of risk disclosures. A small, but not significant positive relationship is the result of the statistical analysis and the difference from the expectation might be explained by the risk disclosure requirements of GAS 5-10, as explained when discussing the relationship with bank size. Due to new regulation that is equal for every bank the relationship in the years 2007-2008 was not expected to be significant positive, but the results show a negative but not significant result. Since the years 2007 and 2008 were unusual due to the financial crisis, which resulted for the first time in years in negative ROAA's and ROAE's for some banks, and the disclosure scores only increased it is difficult state what the general relationship between disclosures and bank profitability is. Especially since other research has also found mixed results.

The final and most interesting relationship that is tested is whether the disclosures scores have significantly increased over the years. A paired samples t-test shows with a significance of not even 0,01 that the quantity and quality have indeed increased significantly, as was expected. Possible and very acceptable explanations in the eyes of the researcher are the introduction of IFRS 7, and to a less extent Basel II, and the increased focus on risks of banks due to the financial crisis. Since it is not possible with this research to measure the effect of the two possible events separate from each other no unambiguous answer can be given to what has caused the significant increase in disclosures.

Despite the effort to overcome certain limitations of other risk disclosure studies, subjectivity of the research method, the time, and a limited sample resulted in limitations of this particular research as well. Validation of the frameworks and ways to increase the reliability of the coding however resulted in conclusions that are according to the researcher the right ones based on the data. Future research is however necessary to get more support for these results. An event study on the possible effects of the introduction of IFRS 7 and the financial crisis is possible, but based on the disclosure framework as developed in this research the influence of risk disclosures on the cost of capital and market efficiency can also be examined. Behavioral studies are as well possible and important, since this will make clearer which information is relevant for the users of the annual reports.

In conclusion, this research has mainly showed that the demand and supply of risk disclosures has increased over the years. For the German banking sector the presence of regulation is however the expected main driver for the increased supply, and not the size and profitability of a bank.

List of tables

List of figures

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Appendices

Appendix I   Definitions risk of financial instruments

Type of risk	Definition in IFRS 7
Financial risk	The risk of a possible future change in one or more of a specified interest rate, financial instrument price, commodity price, foreign exchange rate, index of prices or rates, credit rating or credit index or another variable, provided in the case of a non-financial variable that the variable is not specific to a party to the contract (IFRS 4, appendix A)
Credit risk	The risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation
Liquidity risk	The risk that an entity will encounter difficulty in meeting obligations associated with financial liabilities
Market risk	The risk that the fair value or cash flows of a financial instrument will fluctuate due to changes in market prices. Market risk reflects interest rate risk, currency risk, and other price risk
Interest rate risk	The risk that the fair value of future cash flows of a financial instrument will fluctuate because of changes in market interest rates
Currency risk	The risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates
Other price risk	The risk that the fair value of future cash flows of a financial instrument will fluctuate because of changes in market prices (other than those arising from interest rate risk or currency risk), whether those changes are caused by factors specific to the individual financial instrument or its issuer, or factors affecting all similar financial instruments traded in the market

Table 9 Definitions risk of financial instruments
Source: IFRS

Appendix II   Differences IFRS and German regulation

	IFRS	Germany
Regulatory approach	Piecemeal approach	Comprehensive approach
Major regulation	IAS 1, 37; IFRS 7	Commercial code § 289(1) and § 315(1); Professional standards GAS 5, 20
Reporting instruments	Notes; management commentary proposed	Separate risk report in the management report; few note disclosures
Notion of risk	Various, mainly uncertainty-based	Upside and downside risk; GAS 5 focusing on downside risk
Risk management disclosures	Mainly concerning use of financial instruments	Covering entire corporate risk management
Focus of risk disclosures	Financial and market risk, contingencies	Risk of any category, financial risk highlighted
Disclosure of risk concentrations	Mainly financial risk	Any risk concentration
Disclosure of going-concern uncertainties	Required in notes	Required in risk report and in notes
Risk quantification	Required for financial risk, for contingencies, where practicable	Required of any risk, where practicable, financial risk highlighted
Disclosure of risk forecasts	Not required	Required
Negative reports	Not required	Not required
Special opt-out clause	Yes, IAS 37.92	No

Table 10 Differences IFRS and German regulation
Source: Dobler (2005b)

Appendix III   Summary article Linsley et al. (2006)

Linsley et al. (2006). An exploratory study of UK and Canadian banks, *Journal of Banking Regulation*, vol. 7, no. 3/4, pp. 268-282.

Sample   9 UK and 9 Canadian banks, selected from the top 1,000 banks according to The Banker in 2002

Method   Content analysis by counting risk and risk management sentences. Pearson's rank correlation used to test hypotheses 2-5.

Hypotheses

1   Canadian banks will disclose similar amounts of risk information as their UK counterparts as matched by size → no different level
2   There will be a positive association between the size of the bank and the total quantity of risk disclosures → positive association
3   There will be a positive association between the relative profitability of the bank and the total quantity of risk disclosures → no association
4   There is a positive association between level of risk and the total quantity of risk disclosures →no association
5   There will be a positive association between the quantity of risk definitions disclosed and the total quantity of risk disclosures → positive association

Table 4 Number of risk sentence disclosures for the sample of banks

Text disclosures sentence characteristics		Credit risk	Market risk	Interest rate risk	Operational risk	Capital structure and adequacy risk	Risk management frameworks and Policies	Total
		1	2	3	4	5	6	
Quantitative/good news/future	A	7	0	0	0	3	1	11
Quantitative/bad news/future	B	2	1	1	0	0	0	4
Quantitative/neutral/future	C	22	11	4	2	11	1	51
Qualitative/good news/future	D	191	77	20	60	95	100	543
Qualitative/bad news/future	E	6	5	6	1	6	2	26
Qualitative/neutral/future	F	275	294	84	134	141	228	1156
Quantitative/good news/past	G	101	20	15	7	119	3	265
Quantitative/bad news/past	H	229	16	5	1	15	1	267
Quantitative/neutral/past	I	214	60	38	4	108	0	424
Qualitative/good news/past	J	64	23	22	15	28	14	166
Qualitative/bad news/past	K	30	16	14	1	2	1	64
Qualitative/neutral/past	L	39	9	13	6	10	3	80
Definitions	M	56	79	34	31	59	7	266
Total		1236	611	256	262	597	361	

Table 5 Summary of characteristics of risk disclosures (excluding risk definitions disclosures)

Characteristic	Total number of disclosures	Proportion (%)
Quantitative disclosures	1,022	33.4
Qualitative disclosures	2,035	66.6
Past disclosures	1,266	41.4
Future disclosures	1,791	58.6
Good news disclosures	985	32.2
Bad news disclosures	361	11.8
Neutral disclosures	1,711	56.0

Table 7 Pearson correlation co-efficients for variables

Variable	Pearson correlation	Sig. (2 tailed) for pearson
Nat log of total assets	0.734★	0.001
Nat log of market cap.	0.615★★	0.015
Return on assets	0.121	0.633
Book to market value of equity	−0.194	0.489
Number of risk definitions	0.683★	0.002

★Correlation is significant at the 0.01 level.
★★Correlation is significant at the 0.05 level.

Appendix IV   Overview empirical literature

Author	Sample	Methodology	Results
Basel Committee (2001)	Annual reports 57 banks in 12 countries (1999)	104 questions, 12 categories; yes/no/NA	• Lack of disclosures in area credit risk modeling and internal and external rating; • Most banks disclose key elements capital structure
Basel Committee (2002)	Annual reports 55 banks in 13 countries (2000)	104 questions, 12 categories; yes/no/NA	• Basic information well disclosed, particularly in quantitative form; • Disclosure rates generally increase
Basel Committee (2003)	Annual reports 54 banks in 13 countries (2001)	104 questions, 12 categories; yes/no/NA	• Highest disclosure levels on capital structure, accounting and presentation policies, and other risks; • Increase in disclosure on other risks (operational, legal, liquidity and interest rate risk)
Linsley, Shrives and Crumpton (2006)	Annual reports of 9 UK and 9 Canadian banks (2002)	Content analysis (counting sentences)	• No association between level of risk disclosures and bank profitability • No association between level of disclosure and risk level of the bank; • Positive association between level of risk disclosure and bank size; • Positive association between level of risk disclosure and number of risk definitions; • No statistically different level of risk disclosure between UK and Canadian banks
Helbok and Wagner (2006)	Annual reports of 59 commercial banks in Nord-America, Asia and Europe (1999-2001)	Content analysis (disclosure index study)	• Increase in extent and content of operational risk reporting; • Negative relationship between operational risk reporting and a bank's equity ratio and profitability

Table 11 Empirical studies on risk reporting by banks

Author	Sample	Methodology	Results
Kajüter and Winkler (2003)	247 management reports of German DAX100 listed companies (1999-2001)	Content analysis	• Quantity risk disclosures increased in the period 1999-2001, but non-compliance with GAS5; • Risk reports mainly qualitative; • Large variation in mandatory risk reporting
Fischer and Vielmeyer (2004)	346 management reports of German DAX100 listed companies (1999-2002)	Content analysis	• Quantity risk disclosures increased in the period 1999-2002; • Risk reports mainly qualitative; • Large variation in mandatory risk reporting
Beretta and Bozzolan (2004)	MD&A's of 85 non-financial Italian listed companies (2001)	Content analysis	• Quantity disclosure not satisfactory proxy for quality; • Voluntary risk reporting mainly qualitative; • Size and industry do not affect the disclosure index; • Positive correlation between disclosures and company size
Linsley and Shrives (2006)	Annual reports of 79 non-financial UK FTSE100 listed companies (2000)	Content analysis	• Positive correlation between volume risk disclosure and company size; • Qualitative risk disclosures more prevalent than quantitative; • Statistically significant disclosure of forward-looking information
Abraham and Cox (2007)	Annual reports of 71 non-financial UK FTSE 100 listed companies (2002)	Content analysis	• Corporate ownership by long-term institutions negatively related to risk reporting; • Executive and independent board directors both important in risk reporting; • US-listed UK firms disclose more risk information
Kajüter and Esser (2007)	92 management reports of German HDAX listed companies (2005)	Content analysis	• Large variation in mandatory risk reporting; • Positive relationship between risk disclosures and company size

Author	Sample	Methodology	Results
Amran, Bin and Hassan (2009)	Narrative section annual reports of 100 Malaysian listed companies (2005)	Content analysis	• Majority risk disclosures in chairman's statement; • Positive relationship company size and risk disclosures; • Risk exposure of an industry influences extent of risk disclosures

Table 12 Empirical studies on risk reporting by non-financial companies
Source: Dobler (2008, 191) and own construction

Appendix V   Arthur Anderson Business Risk Model

ARTHUR ANDERSEN *BUSINESS RISK MODEL™*

ENVIRONMENT RISK

Competitor   Sensitivity   Shareholder Relations   Capital Availability
Catastrophic Loss   Sovereign/Political   Legal   Regulatory   Industry   Financial Markets

PROCESS RISK

OPERATIONS RISK

Customer Satisfaction
Human Resources
Product Development
Efficiency
Capacity
Performance Gap
Cycle Training
Sourcing
Obsolescence/
Shrinkage
Compliance
Business Interruption
Product/Service Failure
Environmental
Health and Safety
Trademark/
Brand Name Erosion

EMPOWERMENT RISK

Leadership
Authority/Limit
Outsourcing
Performance Incentives
Change Readiness
Communications

INFORMATION PROCESSING/ TECHNOLOGY RISK

Relevance
Integrity
Access
Availability
Infrastructure

INTEGRITY RISK

Management Fraud
Employee Fraud
Illegal Acts
Unauthorised Use
Reputation

FINANCIAL RISK

Price

Interest Rate
Currency
Equity
Commodity
Financial Instrument

Liquidity

Cash Flow
Opportunity Cost
Concentration

Credit

Default
Concentration
Settlement
Collateral

INFORMATION FOR DECISION MAKING RISK

OPERATIONAL

Pricing
Contract Commitment
Performance
Measurement
Alignment
Completeness and
Accuracy
Regulatory

FINANCIAL

Budget and Planning
Completeness and
Accuracy
Accounting Information
Financial Reporting
Evaluation
Taxation
Pension Fund
Investment Evaluation
Regulatory Reporting

STRATEGIC

Environmental Scan
Business Portfolio
Valuation
Performance
Measurement
Organisation Structure
Resource Allocation
Planning
Life Cycle

Figure 7 Arthur Anderson Business Risk Model
Source: ICAEW (1998, 53)

Appendix VI　　Disclosure framework quantity

Market risk – Interest rate risk

Item	Disclosure requirement	Source	Disclosure score
1	Exposure to risk and how they arise	IFRS 7.33a IFRS 7.IG15	
2	Objectives, policies and processes for managing the risk and the methods used to measure the risk	IFRS 7.33b IFRS 7.IG15	
3	Changes in exposure to risk, measurement of risk, and objectives, policies and processes to manage the risk from the previous period	IFRS 7.33c IFRS 7.IG17	
3a	• Disclosure of changes		
3b	• Explanation for changes		
4	Summary quantitative data about is exposure to risk at the reporting date	IFRS 7.34a	
5	Interest rate sensitivity analysis showing how profit or loss and equity would have been affected by changes in the relevant risk variable that were reasonably possible at that date	IFRS 7.40a	
6	Methods and assumptions used in preparing the sensitivity analysis	IFRS 7.40b	
6a	• Method sensitivity analysis		
6b	• Model used for analysis		
6c	• Assumptions used		
6d	• Explanation of on what the parameters are based		
7	Concentration of interest rate risk if not apparent from summary quantitative data and sensitivity analysis	IFRS 7.34c	

Market risk – Currency risk

Item	Disclosure requirement	Source
8	Exposure to risk and how they arise	IFRS 7.33a IFRS 7.IG15
9	Objectives, policies and processes for managing the risk	IFRS 7.33b IFRS 7.IG15

Item	Disclosure requirement	Source
	and the methods used to measure the risk	
10	Changes in exposure to risk, measurement of risk, and objectives, policies and processes to manage the risk from the previous period	IFRS 7.33c IFRS 7.IG17
10a	• Disclosure of changes	
10b	• Explanation for changes	
11	Summary quantitative data about is exposure to risk at the reporting date	IFRS 7.34a
12	Currency risk sensitivity analysis showing how profit or loss and equity would have been affected by changes in the relevant risk variable that were reasonably possible at that date	IFRS 7.40a
13	Methods and assumptions used in preparing the sensitivity analysis	IFRS 7.40b
13a	• Method sensitivity analysis	
13b	• Model used for analysis	
13c	• Assumptions used	
13d	• Explanation of on what the parameters are based	
14	Concentration of currency risk if not apparent from summary quantitative data and sensitivity analysis	IFRS 7.34c

Market risk – other price risk

Item	Disclosure requirement	Source
15	Exposure to risk and how they arise	IFRS 7.33a IFRS 7.IG15
16	Objectives, policies and processes for managing the risk and the methods used to measure the risk	IFRS 7.33b IFRS 7.IG15
17	Changes in exposure to risk, measurement of risk, and objectives, policies and processes to manage the risk from the previous period	IFRS 7.33c IFRS 7.IG17
17a	• Disclosure of changes	
17b	• Explanation for changes	
18	Summary quantitative data about is exposure to risk at the reporting date	IFRS 7.34a

19	Other price risk sensitivity analysis showing how profit or loss and equity would have been affected by changes in the relevant risk variable that were reasonably possible at that date	IFRS 7.40a
20	Methods and assumptions used in preparing the sensitivity analysis	IFRS 7.40b
20a	• Method sensitivity analysis	
20b	• Model used for analysis	
20c	• Assumptions used	
20d	• Explanation of on what the parameters are based	
21	Concentration of other price risk if not apparent from summary quantitative data and sensitivity analysis	IFRS 7.34c

Credit risk

Item	Disclosure requirement	Source
22	Exposure to risk and how they arise	IFRS 7.33a IFRS 7.IG15
23	Objectives, policies and processes for managing the risk and the methods used to measure the risk	IFRS 7.33b IFRS 7.IG15
23a	• Objectives, policies and processes for managing the risk	
23b	• Methods used to measure the risk	
24	Changes in exposure to risk, measurement of risk, and objectives, policies and processes to manage the risk from the previous period	IFRS 7.33c IFRS 7.IG17
24a	• Disclosure of changes	
24b	• Explanation for changes	
25	Summary quantitative data about is exposure to risk at the reporting date	IFRS 7.34a
26	Concentrations of credit risk if not apparent from summary quantitative date and sensitivity analysis	IFRS 7.34c
27	Amount of maximum exposure to credit risk (before deducting value collateral)	IFRS 7.36a

28	Description of collateral held as security and other credit enhancements	IFRS 7.36b	
29	Information about the credit quality of financial assets with credit risk that are neither past due nor impaired	IFRS 7.36c IFRS 7.IG23	
29a	• Information about credit quality		
29b	• Explanation rating system	IFRS 7.36c IFRS 7.IG24 IFRS 7.IG25	
30	The carrying amount of financial assets that would otherwise be past due or impaired whose terms have been renegotiated	IFRS 7.36a	
31	By class of financial assets an analysis of the age of financial assets that are past due as at the reporting date but not impaired	IFRS 7.37a	
32	By class of financial assets an analysis of financial assets that are individually determined to be impaired at the reporting date, including the factors the entity considered in determining that they are impaired	IFRS 7.37b IFRS 7.IG29	
32a	• Disclosure of factors the entity considered in the impairment		
32b	• Carrying amount of impaired financial assets		
32c	• Amount of impairment loss		
33	Description of collateral held by the entity as security and other credit enhancements for the amounts as disclosed in IFRS 7.37a and b and, unless impracticable, an estimate of their fair value	IFRS 7.37c	
34	Nature and carrying amount of assets obtained by taking possession of collateral it holds as security or called on other credit enhancements, and such assets meet the recognition criteria on other standards	IFRS 7.38a	

Item	Disclosure requirement	Source
35	Policies for disposing assets or use of it in its operations when the assets are not readily convertible into cash	IFRS 7.38b

Liquidity risk

Item	Disclosure requirement	Source
36	Exposure to risk and how they arise	IFRS 7.33a IFRS 7.IG15
37	Objectives, policies and processes for managing the risk and the methods used to measure the risk	IFRS 7.33b IFRS 7.IG15
37a	• Objectives, policies and processes for managing the risk	
37b	• Methods used to measure the risk	
38	Changes in exposure to risk, measurement of risk, and objectives, policies and processes to manage the risk from the previous period	IFRS 7.33c IFRS 7.IG17
38a	• Disclosure of changes	
38b	• Explanation for changes	
39	Maturity analysis for financial liabilities that show the remaining contractual maturities	IFRS 7.39a

Other disclosures

Item	Disclosure requirement
40	Information on subprime exposure and financial crisis

The quantity framework above is divided into different sections, based on the different types of risk that are selected. The items in the framework are derived from the disclosure requirements of IFRS 7, with the exception of item 40. Although the financial crisis started in 2007, information on collateralized debt obligations, residential mortgage backed securities etcetera and the value of them was already mentioned in the annual reports of some banks in the years before the crisis. At that time it was still called innovation in the financial industry.

The framework above includes 40 main items and including the sub-items in total 59 items. If an item is present in the annual report one point is awarded to the item, if the item is not present

no points are given for the item. The disclosure score, between 0 and 1, can be calculated by the following formula, which is explained in section 5.6.

$$DSCORE_{BY} = \frac{1}{MAX_{BY}} \sum_{i=1}^{n} SCORE_{iBY}$$

Although the number of items in the framework is 59 and therefore the maximum score is 59 as well, it might be possible that an item is not relevant for a certain bank in a particular year. In that case the items is not taken into account and the maximum score will be lower than 59.

Appendix VII   Disclosure framework quality

Item	Qualitative characteristic	Quality item	Disclosure score
1	*Relevance*	Disclosure of information on stress scenarios	
2*		Disclosure of the expected future impact of the financial crisis on the bank and its results	
3		Disclosure of information of risk management of credit, liquidity and market risk	
4		Disclosure of whether VaR estimates and limits have been exceeded in the year	
5	*Comparability*	Comparability of the presentation of information of a specific bank over the years	
6		Comparable figures of previous years disclosed	
7		Comparable measurement methods used or explanation for changes given by a specific bank over the years	
8		Accounting standards for (risk) disclosures mentioned	
9	*Reliability*	Mentioned whether or not the risk information in the management report is audited	
10	*Understandability*	Use of tables and graphs to support the text	
11		Definitions of types of risk	
12		Definition of measurement methods used	
13		Explanation of limitations of measurement methods used	

*** Only applicable in the years 2007 and 2008**

The items in the 'quality' framework above are derived from the qualitative characteristics of the IASB and the rationale behind the items is explained in section 5.3.2.

The total number of items in the framework is 13, and therefore the maximum score is 13 as well. For the years 2007 and 2008 item number 2 is however not applicable, since this item is

about the financial crisis and the forward-looking information in the annual reports that is related to this. In the years 2007 and 2008 the maximum score is therefore 12. The following formula can be applied to calculate the disclosure score, between 0 and 1, for every bank and every year and is explained in section 5.6.

$$DSCORE_{BY} = \frac{1}{MAX_{BY}} \sum_{i=1}^{n} SCORE_{iBY}$$

Appendix VIII   Availability English annual reports

Aareal Bank
Baader Wertpapierhandelsbank
Bayern LB
Berlin Hyp
BHF-Bank
Comdirect Bank
Commerzbank *
Corealcredit Bank
DAB Bank
DekaBank Deutsche Girozentrale *
DePfa Deutsche Pfandbriefbank
Deutsche Apotheker- und Ärztebank
Deutsche Bank *
Deutsche Hypo
Deutsche Postbank *
Deutsche Schiffsbank
DG Hyp
Dresdner Bank
DZ Bank
Eurohypo
Helaba
HSBC Trinkaus & Burkhardt
HSH Nordbank
HVB *
IKB Deutsche Industriebank
KfW Bankengruppe *
Landesbank Baden Württemberg
LandesBank Berlin Holding *
L-Bank
LHB Bank
LRP
Metzler
MWB Wertpapierhandelsbank
National-Bank
Westdeutsche ImmobilienBank
WestLB *
WGZ-Bank

Banks included in sample

Source: www.annualreports.info (via KPMG)

Appendix IX   Data variables

Bank	2005	2006	2007	2008	Avg. 05/06	Avg. 07/08
DekaBank Deutsche Girozentrale	0,76	0,78	0,86	0,86	0,77	0,86
Deutsche Bank	0,78	0,81	0,95	0,95	0,80	0,95
Deutsche Postbank	0,53	0,54	0,80	0,81	0,53	0,81
Commerzbank	0,63	0,69	0,80	0,85	0,66	0,82
Hypovereinsbank	0,66	0,63	0,76	0,83	0,64	0,80
KfW Bankengruppe	0,29	0,41	0,92	0,92	0,35	0,92
Landesbank Berlin Holding	0,71	0,73	0,75	0,83	0,72	0,79
West LB	0,59	0,71	0,85	0,88	0,65	0,86

Table 13 Quantity scores per bank

Bank	2005	2006	2007	2008
DekaBank Deutsche Girozentrale	0,75	0,75	0,85	0,85
Deutsche Bank	0,83	0,83	1,00	0,92
Deutsche Postbank	0,75	0,75	0,85	0,85
Commerzbank	0,75	0,75	0,85	0,92
Hypovereinsbank	0,75	0,83	0,92	0,92
KfW Bankengruppe	0,50	0,67	1,00	0,92
Landesbank Berlin Holding	0,75	0,83	0,85	0,85
West LB	0,92	0,83	0,85	1,00

Table 14 Quality scores per bank

Bank	Total assets (mln EUR)			
	2005	2006	2007	2008
DekaBank Deutsche Girozentrale	114982	104928	106482	138609
Deutsche Bank	992161*	1571768	2020349	2202423
Deutsche Postbank	140280	184887	202913	231282
Commerzbank	444861	608339	616474	625196
Hypovereinsbank	493659	508033	422129	458602
KfW Bankengruppe	341143*	334389	393997	394826*
Landesbank Berlin Holding	144520	141625	141247	145371
West LB	294440	285287	286552	288122*

Table 15 Total assets of banks in sample
*Source: Bankscope and * from annual reports*

Bank	Ln Total assets			
	2005	*2006*	*2007*	*2008*
DekaBank Deutsche Girozentrale	**11,65**	**11,56**	**11,58**	**11,84**
Deutsche Bank	**13,81**	**14,27**	**14,52**	**14,61**
Deutsche Postbank	**11,85**	**12,13**	**12,22**	**12,35**
Commerzbank	**13,01**	**13,32**	**13,33**	**13,35**
Hypovereinsbank	**13,11**	**13,14**	**12,95**	**13,04**
KfW Bankengruppe	**12,74**	**12,72**	**12,78**	**12,89**
Landesbank Berlin Holding	**11,88**	**11,86**	**11,86**	**11,89**
West LB	**12,59**	**12,56**	**12,57**	**12,57**

Table 16 Ln total assets of banks in sample
Source: own calculation based on total assets in table X

Bank	ROAA (Net income/avg total assets)			
	2005	*2006*	*2007*	*2008*
DekaBank Deutsche Girozentrale	**0,30**	**0,30**	**0,40**	**-0,10**
Deutsche Bank	**0,40***	**0,40**	**0,40**	**-0,20**
Deutsche Postbank	**0,40**	**0,40**	**0,40**	**-0,40**
Commerzbank	**0,30**	**0,30**	**0,30**	**0,00**
Hypovereinsbank	**0,20**	**1,00**	**1,30**	**-0,20**
KfW Bankengruppe	**0,20***	**0,40***	**-1,80**	**-0,70***
Landesbank Berlin Holding	**0,20**	**0,50**	**0,20**	**0,00**
West LB	**0,10***	**0,30**	**-0,60**	**0,00***

Table 17 ROAA of banks in sample
*Source: Bankscope and * calculated based on figures from the annual reports (table X)*

	Deutsche Bank	**KfW Bankengruppe**	**West LB**
Total assets 2004 (mln EUR)	840068	328596	253792
Total assets 2005 (mln EUR)	992161	341143	264955
Average total assets 2005 (mln EUR)	916114,5	334869	259373,5
Net income 2005 (mln EUR)	3529	624,85	308,85
ROAA 2005	0,40	0,20	0,10
Total assets 2005 (mln EUR)		341143	
Total assets 2006 (mln EUR)		359606	
Average total assets 2006 (mln EUR)		350374,5	
Net income 2006 (mln EUR)		1564	
ROAA 2006		0,40	
Total assets 2007 (mln EUR)		353997	287416
Total assets 2008 (mln EUR)		394826	288122
Average total assets 2008 (mln EUR)		374411,5	287769
Net income 2008 (mln EUR)		-2647	18
ROAA 2008		-0,70	0,00

Table 18 Calculation ROAA of banks in sample

Bank	ROAE (Net income/avg equity)			
	2005	*2006*	*2007*	*2008*
DekaBank Deutsche Girozentrale	**12,10**	**11,80**	**13,20**	**-3,50**
Deutsche Bank	**12,60***	**19,70**	**18,20**	**-11,10**
Deutsche Postbank	**10,00**	**13,60**	**16,40**	**-16,00**
Commerzbank	**10,30**	**12,40**	**12,30**	**0,30**
Hypovereinsbank	**7,10**	**28,70**	**26,10**	**-2,80**
KfW Bankengruppe	**7,20***	**16,40***	**-39,00**	**-19,80***
Landesbank Berlin Holding	**8,50**	**24,70**	**8,10**	**1,20**
West LB	**6,40***	**12,60**	**-28,60**	**0,40***

Table 19 ROAE of banks in sample
*Source: Bankscope and * calculated based on figures from the annual reports (table X)*

	Deutsche Bank	**KfW Bankengruppe**	**West LB**
Equity 2004 (mln EUR)	25904	8355	3844
Equity 2005 (mln EUR)	29936	8999	5841
Average equity 2005 (mln EUR)	27920	8677	4842,5
Net income 2005 (mln EUR)	3529	624,85	308,85
ROAE 2005	12,60	7,20	6,40
Equity 2005 (mln EUR)		8999	
Equity 2006 (mln EUR)		10028	
Average equity 2006 (mln EUR)		9513,50	
Net income 2006 (mln EUR)		1564	
ROAE 2006		16,40	
Equity 2007 (mln EUR)		14936	4464
Equity 2008 (mln EUR)		11820	3821
Average equity 2008 (mln EUR)		13378	4142,5
Net income 2008 (mln EUR)		-2647	18
ROAE 2008		-19,80	0,40

Table 20 Calculation ROAE of banks in sample

Appendix X   Statistical results

A. Including all data (2005-2008)

Step 1: input in PSAW

Figure 8 All data in PSAW

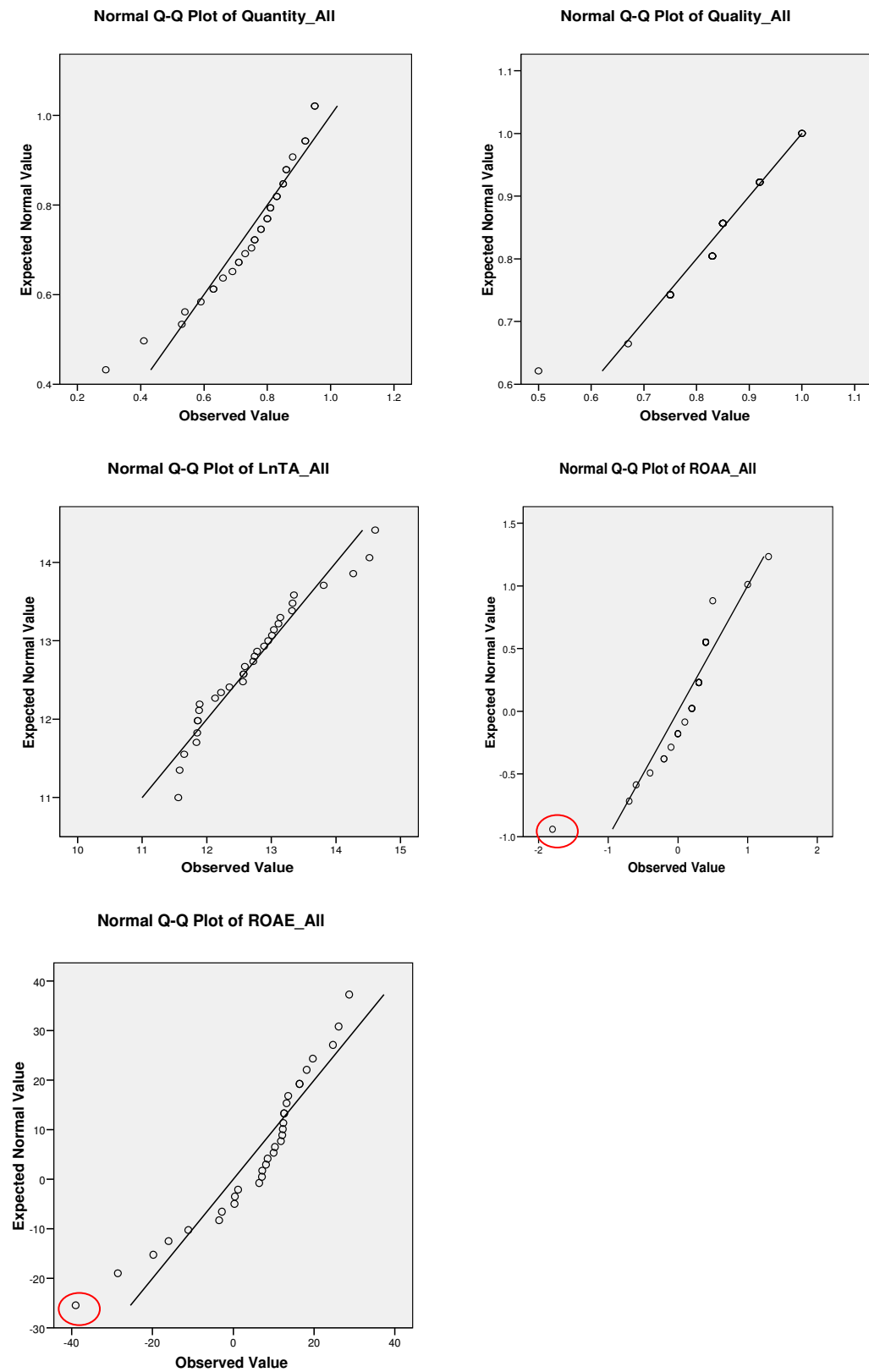*Step 2:* testing normal distribution with QQ-plots

Figure 9 QQ-plots all data

Step 3: calculation of correlations between variables

Analyze > Correlation > Bivariate > variables Quantity_All, Quality_All, LnTA_All, ROAA_All, ROAE_All > Pearsons correlation > 2-tailed

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Quantity_All	32	.29	.95	.7459	.15185
Quality_All	32	.50	1.00	.8325	.10223
LnTA_All	32	11.56	14.61	12.7047	.82584
ROAA_All	32	-1.80	1.30	.1469	.52608
ROAE_All	32	-39.00	28.70	5.9219	15.17278
Valid N (listwise)	32				

Table 21 Descriptive statistics all data

Correlations

		Quantity_All	Quality_All	LnTA_All	ROAA_All	ROAE_All
Quantity_All	Pearson Correlation	1	,820**	,215	-,394*	-,409*
	Sig. (2-tailed)		,000	,238	,026	,020
	N	32	32	32	32	32
Quality_All	Pearson Correlation	,820**	1	,284	-,324	-,329
	Sig. (2-tailed)	,000		,115	,070	,066
	N	32	32	32	32	32
LnTA_All	Pearson Correlation	,215	,284	1	,001	-,003
	Sig. (2-tailed)	,238	,115		,995	,987
	N	32	32	32	32	32
ROAA_All	Pearson Correlation	-,394*	-,324	,001	1	,946**
	Sig. (2-tailed)	,026	,070	,995		,000
	N	32	32	32	32	32
ROAE_All	Pearson Correlation	-,409*	-,329	-,003	,946**	1
	Sig. (2-tailed)	,020	,066	,987	,000	
	N	32	32	32	32	32

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 22 Correlations 2005-2008

Correlations

		Quantity_0506	Quality_0506	LnTA_0506	ROAA_0506	ROAE_0506
Quantity_0506	Pearson Correlation	1	,685**	,097	,078	,231
	Sig. (2-tailed)		,003	,720	,773	,390
	N	16	16	16	16	16
Quality_0506	Pearson Correlation	,685**	1	,144	,209	,305
	Sig. (2-tailed)	,003		,596	,437	,251
	N	16	16	16	16	16
LnTA_0506	Pearson Correlation	,097	,144	1	,162	,172
	Sig. (2-tailed)	,720	,596		,549	,525
	N	16	16	16	16	16
ROAA_0506	Pearson Correlation	,078	,209	,162	1	,886**
	Sig. (2-tailed)	,773	,437	,549		,000
	N	16	16	16	16	16
ROAE_0506	Pearson Correlation	,231	,305	,172	,886**	1
	Sig. (2-tailed)	,390	,251	,525	,000	
	N	16	16	16	16	16

**. Correlation is significant at the 0.01 level (2-tailed).

Table 23 Correlations 2005-2006 all data

Correlations

		Quantity_0708	Quality_0708	LnTA_0708	ROAA_0708	ROAE_0708
Quantity_0708	Pearson Correlation	1	,613*	,548*	-,497	-,439
	Sig. (2-tailed)		,012	,028	,050	,089
	N	16	16	16	16	16
Quality_0708	Pearson Correlation	,613*	1	,567*	-,250	-,149
	Sig. (2-tailed)	,012		,022	,351	,583
	N	16	16	16	16	16
LnTA_0708	Pearson Correlation	,548*	,567*	1	,009	,009
	Sig. (2-tailed)	,028	,022		,972	,973
	N	16	16	16	16	16
ROAA_0708	Pearson Correlation	-,497	-,250	,009	1	,946**
	Sig. (2-tailed)	,050	,351	,972		,000
	N	16	16	16	16	16
ROAE_0708	Pearson Correlation	-,439	-,149	,009	,946**	1
	Sig. (2-tailed)	,089	,583	,973	,000	
	N	16	16	16	16	16

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 24 Correlations 2007-2008 all data

B. Excluding KfW Bankengruppe 2007

Step 1: input in PSAW

Figure 10 Data excl. KfW Bankengruppe 2007 in SPSS

Step 2: Testing normal distribution with QQ-plots
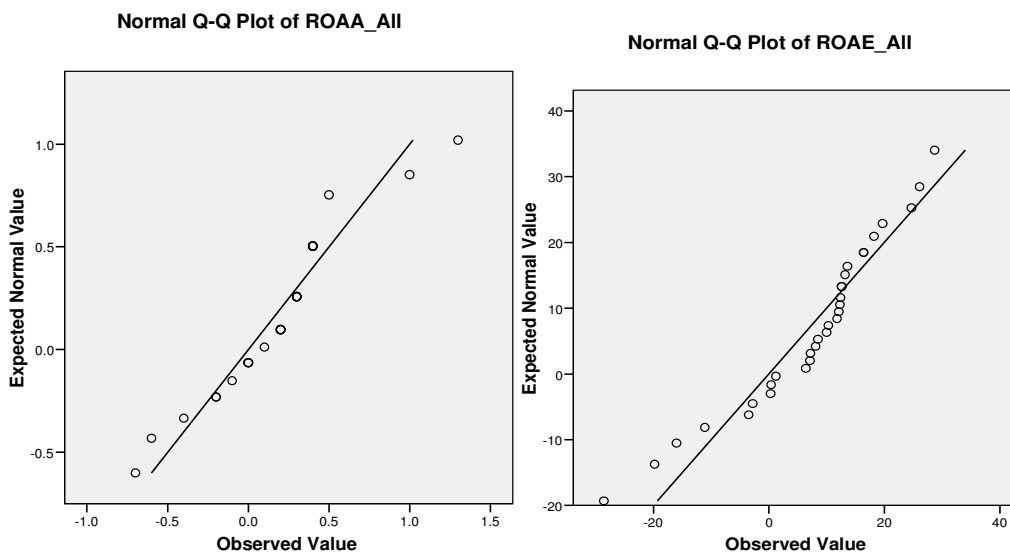

Figure 11 QQ-plots ROAA and ROAE excl. KfW Bankengruppe 2007

Step 3: calculation of correlations between variables

Analyze > Correlation > Bivariate > variables Quantity_0708, Quality_0708, ROAA_0708, ROAE_0708 > Pearsons correlation > 2-tailed

Descriptive Statistics

	Mean	Std. Deviation	N
Quantity_0708	,8467	,06055	15
Quality_0708	,8933	,05434	15
ROAA_0708	,0533	,48970	15
ROAE_0708	,9600	15,28238	15

Table 25 Descriptive statistics excl. KfW Bankengruppe 2007

Correlations

		Quantity_0708	Quality_0708	ROAA_0708	ROAE_0708
Quantity_0708	Pearson Correlation	1	,562*	-,422	-,343
	Sig. (2-tailed)		,029	,117	,211
	N	15	15	15	15
Quality_0708	Pearson Correlation	,562*	1	,106	,142
	Sig. (2-tailed)	,029		,708	,613
	N	15	15	15	15
ROAA_0708	Pearson Correlation	-,422	,106	1	,937**
	Sig. (2-tailed)	,117	,708		,000
	N	15	15	15	15
ROAE_0708	Pearson Correlation	-,343	,142	,937**	1
	Sig. (2-tailed)	,211	,613	,000	
	N	15	15	15	15

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 26 Correlations 2007-2008 excl. KfW Bankengruppe 2007

C. Excluding KfW Bankengruppe 2007 and West LB 2007

Step 1: input in PSAW

Figure 12 Data excl. KfW Bankengruppe 2007 and West LB in SPSS

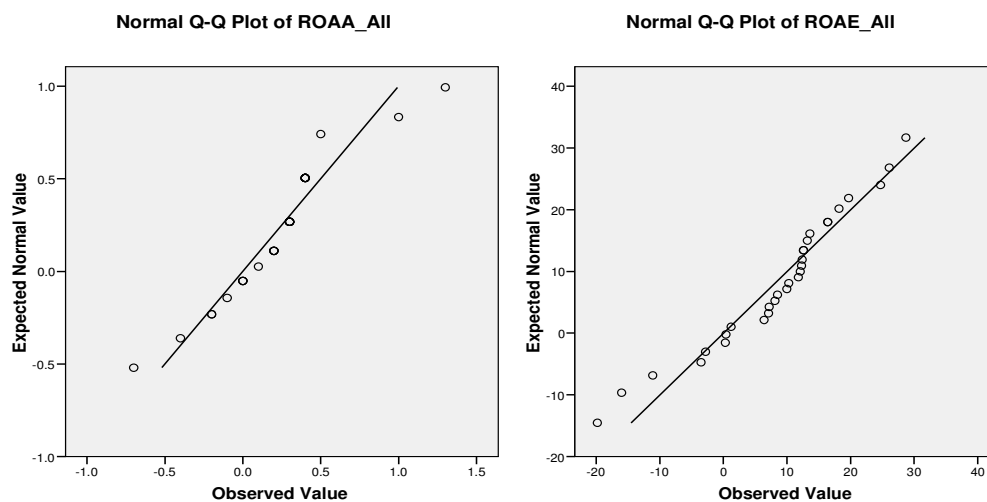*Step 2:* Testing normal distribution with QQ-plots

Figure 13 QQ-plots ROAA and ROAE excl. KfW Bankengruppe 2007 and West LB 2007

Step 3: calculation of correlations between variables

Analyze > Correlation > Bivariate > variables Quantity_0708, Quality_0708, ROAA_0708, ROAE_0708 > Pearsons correlation > 2-tailed

Descriptive Statistics

	Mean	Std. Deviation	N
Quantity_0708	,8464	,06283	14
Quality_0708	,8964	,05500	14
ROAA_0708	,1000	,47231	14
ROAE_0708	3,0714	13,39779	14

Table 27 Descriptive statistics excl. KfW Bankengruppe 2007 and West LB 2007

Correlations

		Quantity_0708	Quality_0708	ROAA_0708	ROAE_0708
Quantity_0708	Pearson Correlation	1	,579*	-,448	-,396
	Sig. (2-tailed)		,030	,108	,161
	N	14	14	14	14
Quality_0708	Pearson Correlation	,579*	1	,027	,029
	Sig. (2-tailed)	,030		,928	,920
	N	14	14	14	14
ROAA_0708	Pearson Correlation	-,448	,027	1	,941**
	Sig. (2-tailed)	,108	,928		,000
	N	14	14	14	14
ROAE_0708	Pearson Correlation	-,396	,029	,941**	1
	Sig. (2-tailed)	,161	,920	,000	
	N	14	14	14	14

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 28 Correlations excl. KfW Bankengruppe 2007 and West LB 2007

Note: excluding besides KfW Bankengruppe 2007 also West LB 2007 does not result in different conclusions about the relationship between quantity and quality and profitability. For the conclusions the results of excluding both KfW and West LB are therefore not taken into account.

D. Paired-samples t-test

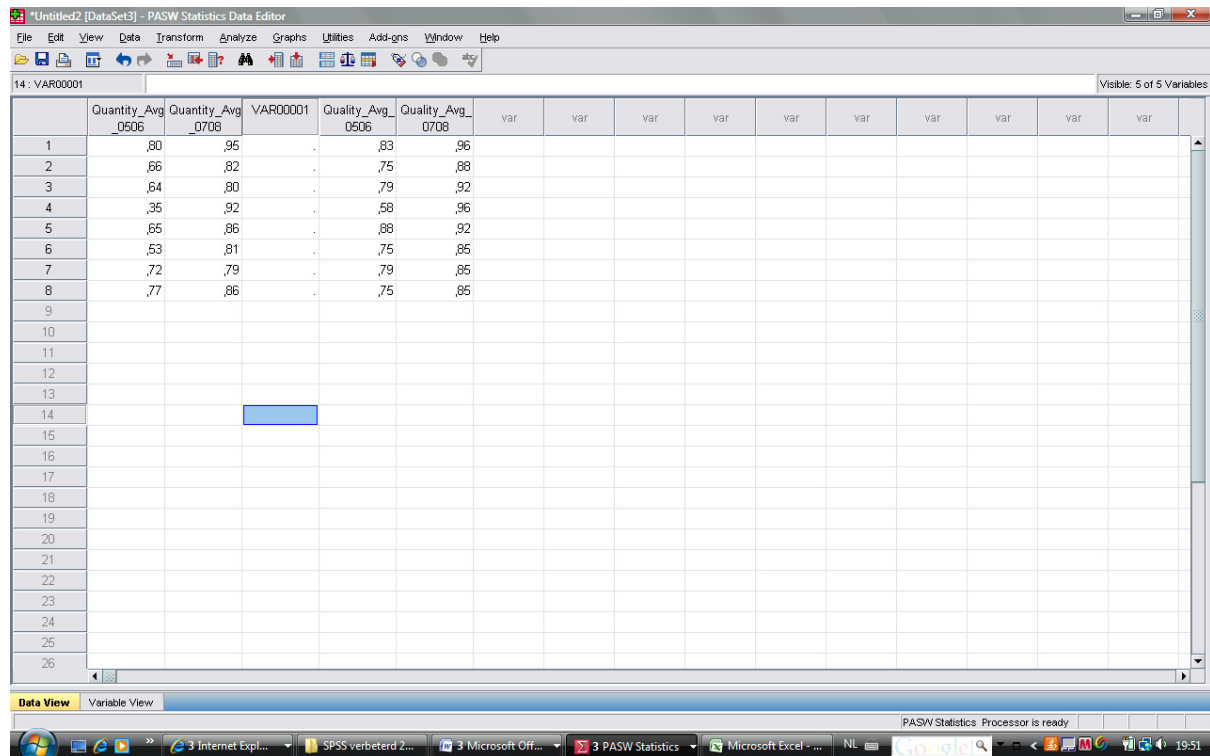*Step 1:* average disclosure scores as input

Figure 12 Data t-test in PSAW

Step 2: paired samples t-test

Analyze > Compare means > Paired samples t-test > Pair 1: Variable 1: Quantity_Avg_0506, Variable 2: Quantity_Avg_0708; Pair 2: Variable 1: Quality_Avg_0506, Variable 2: Quality_Avg_0708

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Quantity_Avg_0506	,6400	8	,14422	,05099
	Quantity_Avg_0708	,8513	8	,05817	,02057
Pair 2	Quality_Avg_0506	,7650	8	,08751	,03094
	Quality_Avg_0708	,8987	8	,04764	,01684

Table 29 Descriptive statistics paired samples t-test

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Quantity_Avg_0506 - Quantity_Avg_0708	-,21125	,15905	,05623	-,34422	-,07828	-3,757	7	,007
Pair 2	Quality_Avg_0506 - Quality_Avg_0708	-,13375	,10501	,03713	-,22154	-,04596	-3,603	7	,009

Table 30 Output paired samples t-test