Master Degree Project in Accounting

Evaluation of the Quality of Bank Accounting Data: Evidence from Equity, Bond and CDS Markets

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Acknowledgments

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Abstract

The financial crisis has raised again the importance of financial reporting in the banking sector. The core role of banks in the financial crisis stimulated the discussion and the analysis regarding the bank accounting quality. Aiming at contributing to this ongoing debate, the current study's purpose is to evaluate the quality of bank accounting information. By using archival data from Equity, Bond, and CDS markets across 2005-2011 and correlating them with bank Loan Loss Provisions (LLP) this paper scrutinizes the relevance of bank financial figures. The empirical findings indicate that bank LLP is significant in explaining the variation in these markets. Furthermore, a significant difference in the relevance of accounting numbers between banks applying IFRS and US banks applying US GAAP is apparent. The results reveal also a substantial deviation in the effect of bank LLP before and after the crisis. As expected, bank LLP is more relevant to the decision making needs of CDS markets compared to equity and bond markets. Collectively, the empirical results render bank accounting information relevant to users' decision making needs and is thus of good quality.

Keywords: Accounting quality, relevance, banks, loan loss provisions, equity, bonds, CDS, IFRS, and US GAAP.

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Introduction

The outbreak of the financial crisis in the middle of 2007 led several commercial and investment banks to bankruptcy. The consequence of the crisis was a near systemic collapse of the banking industry upon which the commercial lending activity is based (Barth & Landsman, 2010). This global financial crisis has again shown the significance of financial reporting in the banking industry (Gebhardt & Novotny-Farkas, 2011). The fact that banks were at the core of the crisis, stimulated the discussion and the analysis regarding bank financial reporting (Barth & Landsman, 2010). The ongoing debate is mainly focused on fair-value accounting and whether or not it has contributed to the financial crisis (Barth & Landsman, 2010; Magnan, 2009; Gebhardt & Novotny-Farkas, 2011; Laux & Leuz, 2009; Wallace, 2008-2009). Fair-value accounting has been criticized for not being of sufficient quality and consequently not being value relevant to investors and other users of the accounting information (Barth & Landsman, 2010). However, empirical findings have shown that fair-value accounting has played little or no role in the financial crisis (Gebhardt & Novotny-Farkas, 2011; Barth & Landsman, 2010; Laux & Leuz, 2009). Rather the incurred loss model, which will be discussed later, seems to have contributed to the crisis (Barth & Landsman, 2010).

The application of professional judgment, especially regarding the use of fair-value, in the production of financial statements has been debated extensively (Laux & Leuz, 2009; Barth & Landsman, 2010). In addition, a more general discussion concerning the benefits of principles-based versus rules-based standards has emerged (Schipper, 2003; Benston, et al., 2006). Undoubtedly, principles-based standards (i.e. IFRS) require greater exertion of professional judgment than rules-based standards (i.e. US GAAP) do (Benston, et al., 2006; Schipper, 2003; Nobes, 2005; Bennett, et al., 2006; Carmona & Trombetta, 2008).

One financial accounting area which involves high judgment is the estimation of bank credit losses. Credit losses in banks are characterized by high measurement uncertainty and consequently by a high level of discretion in their estimation (Anandarajan, et al., 2007; Hess, et al., 2009; Kanagaretnam, et al., 2004; Liu, et al., 1997; Lobo & Yang, 2001; Pérez, et al., 2008; Fonseca & González, 2008; Beaver & Engel, 1996). Management's incentives for exerting professional judgment as well as the way the judgment is used have been scrutinized in depth by the academic community (Lobo & Yang, 2001). The stability of the banking industry has significant economic importance since banks are the foundation on which the contemporary financial system is based. Therefore, a potential instability in the banking sector can threaten the entire economic system. Asset quality problems in general and credit losses in particular have often been acknowledged as the main causes of bank failure (Hess, et al., 2009). Hence, it can be assumed that the estimation of credit losses in banks is an accounting information of great significance.

Besides the credit loss estimates made by the bank management, market actors make their own ones. In general, markets are able to make their own estimates concerning the market value of loans even with incomplete financial information. Through that they assess the market value of banks themselves (Diaz & McLeay, 1996). It can be hypothesized that such estimates are reflected on the cost of equity capital, CDS spreads and bond interest rates.

The present study contributes to the literature in two ways. First, the primary research objective is to evaluate the quality of bank accounting information. More precisely, the research focus will be on the relevance[1] of bank accounting information relative to three financial markets: equity, bond, and CDS markets. These three markets capture relatively different economic aspects. Equity markets capture future performance and liquidity, bond markets capture liquidity and default risk, and CDS markets capture pure default risk[2]. The difference in the economic perspectives of interest implies also variation in their decision making needs. Therefore, it is likely the same piece of accounting information to be evaluated differently by the three studied markets. Likewise, a variation in the relevance of bank accounting data with respect to the varying decision making needs of the three markets might be present. Whether or not the accounting relevance in the banking sector differs between equity, bond, and CDS markets is core issue in the present study. The assessment of the relevance will be made by investigating whether the disclosed bank financial data can predict these three distinct markets or not. Specifically, if bank accounting information predicts the fluctuation in stock prices, bond credit spreads and CDS premia then it will be assumed that such information is indeed relevant and thus of high quality. If, on the other hand, bank accounting information cannot predict the behavior of the three markets then the accounting data will be perceived as non-relevant and thus of poor quality[3]. Overall, it is expected the reported credit losses to have superior predictive ability. In periods characterized by uncertainty, however, it is expected the credit losses to perform poorly. Second, a comparison of the relevance of accounting data between banks applying IFRS and US banks under US GAAP will be made. What triggers such an analysis is that the differences in the accounting for financial instruments under IFRS and US GAAP exceed the similarities. With regard to

[1] According to IASB's Conceptual framework, the accounting information must incorporate four principal qualitative characteristics: understandability, relevance, reliability, and comparability. These four qualitative features make the accounting information useful to the users' needs. With regard to relevance, the accounting data is perceived as relevant when it serves the decision-making needs of users. In this respect, accounting information integrates the qualitative feature of relevance when it influences the economic decisions of users by supporting them in assessing past, present and future events as well as confirming and/or correcting their past assessments (Alexander, et al., 2011). The "relevance" as a qualitative characteristic of the accounting information is included in both IASB's and FASB's conceptual frameworks.

[2] Detailed information is provided in section 4.

[3] If the latter is the case, a further investigation of whether the credit loss estimates made by the three markets can predict the accounting information in banks can be very informative. However, such analysis is beyond the scope of this study.

loans, it is likely the same instrument to be reported at different amounts under the two sets of standards (PwC, 2012). At the same time, though, the accounting handling of credit losses is identical (GrantThornton, 2012). Therefore, an analysis on that level will add useful insights to the discussion concerning the accounting quality under IFRS and US GAAP. This issue is more than ever a "hot" topic due to IASB's and FASB's joint work in developing one global set of standards (Barth, et al., 2012).

The empirical findings of the present thesis denote that bank accounting figures are indeed relevant to the decision making needs of equity, bond, and CDS markets. More precisely, the regression analysis have shown that bank reported credit losses are significant in explaining the variance in stock returns, bond credit spreads, and CDS premia. Unexpectedly, though, the sign of the effect of credit losses on bond and CDS markets contradicts the expectations. This finding indicates that both markets consider various firm-specific and market-wide factors when assessing banks' credit quality. Furthermore, time-varying factors, such as the financial crisis, influence these two markets to a great extent. Finally, a significant difference in the relevance between banks applying IFRS and US banks applying US GAAP is apparent. However, the econometric analysis did not provide evidence neither on which of the two frameworks is better with respect to the accounting data relevance nor on the causes of this discrepancy.

The remainder of the paper is organized as follows. Section 1 discusses the application of professional judgment in accounting standards. Section 2 discusses the Financial Instruments accounting under IFRS and US GAAP. In Section 3, the main management incentives that are likely to affect the accounting quality in banking industry are summarized. The expected relation between bank credit losses, cost of equity capital, bond interest rates, and CDS premia as well as the hypotheses of the study are discussed in section 4. Section 5 presents the bank sample and the dataset of the study. Section 6 discusses the methodology and the modeling approach. The descriptive statistics along with the empirical results are illustrated in section 7. Section 8 discusses the empirical findings. The conclusions along with future research are presented in section 9. Finally, section 10 discusses the study limitations.

1. Judgment in Accounting Standards

The estimation of credit losses in banks is an accounting area which incorporates high judgment. The fact that credit losses in banks are characterized by high measurement uncertainty enhances the application of professional judgment by bank managers in their estimates (Anandarajan, et al., 2007; Hess, et al., 2009; Kanagaretnam, et al., 2004; Liu, et al., 1997; Lobo & Yang, 2001; Pérez, et al., 2008; Fonseca & González, 2008). The underlying benefit of permitting professional judgment in the production of financial statements is to enable management to convey proprietary information. At the same time, however, the allowance for exerting discretion enables managers to be self-interested in

using judgment, biasing the financial statements for their own benefit. Hence, there are two contradictory effects in the application of professional judgment, and the extent to which, as well as under what conditions, each dominates, is yet a blurry issue (Barth & Clinch, 1998). In that sense, the critical question in the present thesis is: are there any differences between IFRS and US GAAP concerning the allowance for applying professional judgment and how these differences affect the accounting quality?

In principles-based standards (i.e. IFRS) the professional judgment is identified as a distinctive element of the accounting process. Under such regimes the accountants are required to make a substantial number of estimates for which they are held responsible. Thus, IFRS leaves it up to companies to choose any accounting practice that does not contravene the principles in the standards (Carmona & Trombetta, 2008). Likewise, Bennett et al. (2006) in their comparative analysis between US GAAP and IFRS acknowledge that managerial discretion is vital for the application of principles-based standards. They conclude that principles-based standards require relatively more exertion of professional judgment at both transaction and financial reporting level than rules-based do.

The openness and the flexibility of the principles-based standards could be problematic concerning the comparability of accounting numbers (Benston, et al., 2006; Carmona & Trombetta, 2008). Rules-based standards (i.e. US GAAP), on the other hand, increase the comparability by mitigating the effects of differences in professional judgment (Schipper, 2003; Nobes, 2005). However, the intrinsic flexibility of principles-based standards could perform as a deterrent to fraud (Carmona & Trombetta, 2008). In contrast, Benston et al. (2006) argue that detailed rules and guidance regarding the application of standards moderate management's opportunities to use judgment in manipulating the reported earnings. Yet, even though rules-based standards reduce the likelihood of managing earnings through judgment, in such regimes managers' ability to manage the earnings through transaction structuring is increased (Schipper, 2003; Nobes, 2005). Regardless of the way earnings manipulation is achieved it is yet vague if and how earnings management affects the comparability, the relevance and the reliability of accounting data (Schipper, 2003). Likewise, Pérez et al. (2008) claim that although the accounting quality issue has drawn the attention of academics and policy-makers, the extent to which earnings and capital manipulation could be beneficial for the market efficiency or mislead investors' decisions is not yet identified.

The need for extensive rules may arise from the lack of principles or the use of an inappropriate principle. In this respect, principle-based standards very often include rules. Hence, the question is not whether principles-based standards are better than rules-based standards, but rather if the absence of principles or the use of inappropriate principles lead the standard setters to prescribe detailed implementation rules (Nobes, 2005). Arguably, the optimal standards are somewhere in between principles-only and rules-

only. Towards a universal set of standards US GAAP has included more principles and IFRS, on the other hand, more implementation rules (Benston, et al., 2006).

Though the issue of principles-based vs. rules-based standards is not within the scope of the present thesis, such analysis is useful in the sense that unveils differences and similarities, especially regarding the application of professional judgment, between IFRS and US GAAP that are likely to affect the accounting quality.

2. Financial Instrumets and accounting quality under IFRS and US GAAP

2.1. Financial Instruments accounting

Evidently, the debate of principles-based vs. rules-based standards has been on the focus of the accounting research for years. Besides the fundamental differences between IFRS and US GAAP, substantial deviations in the actual standards are also present (see Schipper (2003) and Nobes (2005)). The fact that the accounting treatment of financial instruments is of great importance in the present study motivates the analysis of the relevant standards. In this respect, the subsequent discussion aims at revealing potential differences and similarities in the financial instruments accounting under the two distinct frameworks.

In an attempt to frame the causes of the global financial crisis and propose actions that should be taken towards a more powerful and stable financial environment, the G20 has proposed that the principles associated with Loan Loss Provisions accounting should be improved to consider a *"broader range of credit information"*. In response to the G20 proposal, IASB and FASB devote much of their resources in scrutinizing the existing accounting treatment of Loan Loss Provisions. Such efforts are part of a broader IASB and FASB project which aims at developing improved Financial Instruments standards towards a greater convergence between IFRS and US GAAP. Although both the IASB and the FASB agree upon the need for a new guidance regarding Loan Loss Provisioning as it is proposed by the G20, there are still fundamental deviations in their respective thoughts about how this should be accomplished (PwC, 2012).

Both IASB's and FASB's Financial Instruments standards are dealing with a wide range of financial products, such as for instance derivatives, bonds, swaps, stocks, loans and receivables. Substantial differences in Financial Instruments accounting between IFRS and US GAAP can be traced in the classification, measurement, impairment and derecognition of financial instruments (PwC, 2012). For the purpose of the study, the analysis will concentrate on the accounting treatment of loans.

The classification of loans under US GAAP is driven by the legal form of the instrument; while under IFRS it is the nature of the instrument along with whether or not an active market exists that determine its categorization. Consequently, the potential differences in the classification result in subsequent measurement differences for the same debt instrument under IFRS and US GAAP. Therefore, loans may be carried at different amounts under the two standard frameworks (PwC, 2012). The initial measurement of loans under IFRS is made at fair-value plus any directly attributable transaction costs. Subsequently, loans are measured at amortized cost. US GAAP, on the other hand, require loans' initial measurement to be made at cost and the subsequent measurement at the lower between cost and fair-value (KPMG, 2012). With regard to loan impairment, US GAAP stipulates two distinct treatments: either the impairment losses driven by changes in fair-value should be recognized in the income statement or the difference between fair-value and the post-impairment amortized cost should be recorded in the other comprehensive income (OCI). Whether the impairment loss will be released in the income statement or in the OCI depends on management's discretion. Under IFRS, on the contrary, when the impairment of a loan is determined to be triggered, the aggregate loss calculated by discounting the estimated future cash flows and reported in OCI is recognized in the income statement (PwC, 2012). At this point, it is worth noting that loan impairment triggers under both IFRS and US GAAP are identical. Both frameworks stipulate that a loan should be impaired when there are objective indications dictating that impairment should be made (GrantThornton, 2012).

Arguably, the substantial differences in the accounting for loans under IASB's and FASB's frameworks can result in deviations concerning the reporting of the same instruments. Yet, the two standards exhibit significant similarities as well (e.g. loan impairment triggers). Therefore it is difficult to claim whether the financial instruments accounting between IFRS and US GAAP differs or not. With regard to credit loss recognition, though, it appears that the two frameworks prescribe identical accounting treatments. In any case a more thorough analysis of the actual financial instruments standards will shed light on whether the similarities dominate over the differences or vice versa.

2.2. Accounting quality under IFRS and US GAAP

As discussed so far, significant differences between the two accounting sets of standards are evident. Arguably these differences may result in discrepancies in the accounting quality between IFRS and US GAAP. The study's intention to compare banks applying IFRS and US banks applying US GAAP in terms of relevance renders the illumination of the accounting quality issue under the two alternative frameworks vital for the paper's scope.

Although there is considerable literature scrutinizing the accounting quality along with the effects of IFRS adoption on financial markets, there are fewer insights on those issues as they arise from the application of IFRS and US GAAP (Barth, et al., 2012; Leuz, 2003). Previous studies focusing on the issue of whether or not accounting quality varies between IFRS and US GAAP indicate that both frameworks produce financial information of equal quality. Leuz (2003) in his study analyze metrics of information asymmetry and concludes that any differences in stock returns, liquidity and bid/ask spreads for firms applying IFRS relative to those applying US GAAP are insignificant in terms of economic and statistical substance. In a similar study setting, Van der Meulen et al. (2007) report that accounting figures under US GAAP are of better quality compared to IFRS with respect to their predictive ability. They argue, however, that this difference is not fully appreciated by investors since both frameworks tend to produce information that is similar with regard to value relevance. In both these studies, however, the researchers analysed German firms that where cross-listed[4] in the US and had the option to apply either IFRS or US GAAP.

Even though those studies add insights concerning the quality of accounting figures under IFRS and US GAAP, their results might not be fully representative. US firms operate in a very different context relative to firms from other countries that are cross-listed in the US. In that sense, non-US firms that apply US GAAP have different incentives and operate in different enforcement, regulation and litigation environment than US firms do. Therefore, by analysing non-US firms that apply US GAAP it is likely the findings regarding the quality of accounting information to be biased. Furthermore, the firms in those two studies were not obliged to apply US GAAP. Their objective was more to reconcile the accounting numbers to US GAAP rather than comprenhensively apply FASB's framework. Hence, it is likely the reported ammounts are not the same as they would be if the application of US GAAP was mandatory rendering the evaluation of accounting quality misleading (Barth, et al., 2012). It is evident that there is a gap in the literature with regard to the quality of accounting figures as they measured by the application of IFRS and US GAAP.

In an effort to address this gap, Barth et al. (2012) scrutinized and compared the accounting quality between firms applying IFRS and US firms applying US GAAP. Their findings indicate that, in general, accounting quality is higher for firms applying US GAAP relative to firms under IFRS. They claim that US GAAP generate accounting figures of higher value relevance for investors than IFRS do. As they show, the difference in value relevance is greater during the period 2007-2009.

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[4] The term "cross-listed" refers to firms whose common equity is listed in a different exchange than their primary stock exchange.

By comparing the relevance of accounting information between non-US banks applying IFRS and US banks applying US GAAP, this study aims to contribute to this gap in the literature. Such insights can be informative for and be used by regulators, especially now when IASB and FASB work jointly in developing a global framework of accounting standards.

3. Management's incentives and Accounting Quality

The question whether or not the extensive application of professional judgment in the estimation of credit losses stimulates specific managerial incentives which in turn may affect the accounting quality is reasonably risen. Although this issue is not within the scope of the present thesis, an analysis on that level will shed light on the motives behind specific accounting choices that are likely to influence bank accounting quality. Such insights contribute to the theoretical framework upon which the primary objective of the paper is based.

Accounting quality has been an issue of much concern for both the academic community and the policy makers. Managerial efforts aiming at regulatory capital and earnings management have a great influence on the quality of accounting information. Thus, it is quite reasonable that a significant volume of empirical research has focused on the impact of capital and earnings management on accounting quality (Pérez, et al., 2008). In this respect, several empirical studies have scrutinized whether or not banks use Loan Loss Provisions for manipulating their reported earnings and/or their regulatory capital[5] (Ahmed, et al., 1999; Anandarajan, et al., 2007; Hess, et al., 2009; Kanagaretnam, et al., 2004; Lobo & Yang, 2001; Pérez, et al., 2008; Laeven & Majnoni, 2003; Liu & Ryan, 2006; Rivard, et al., 2003). In addition to capital and earnings management, some of these studies have also investigated the use of LLP by banks for signaling internal information (Ahmed, et al., 1999; Anandarajan, et al., 2007; Kanagaretnam, et al., 2004; Lobo & Yang, 2001).

Loan Loss Provisions illustrate management's anticipated credit losses in the financial statements (Ahmed, et al., 1999; Anandarajan, et al., 2007; Kanagaretnam, et al., 2004; Liu, et al., 1997; Lobo & Yang, 2001). LLP is identified as the main operating accrual in banking industry (Gebhardt & Novotny-Farkas, 2011; Fonseca & González, 2008; Kanagaretnam, et al., 2004; Lobo & Yang, 2001). Due to their relatively large portion in banking accruals, LLP affects significantly bank reported earnings (Ahmed, et al., 1999).

Findings from prior research indicate a very positive relation between LLP and earnings management. One may trace the roots of earnings management practices in bank managers' desire to either increase their remuneration or to manipulate market's

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[5] The term "regulatory capital" refers to banks obligation to maintain a minimum level of capital as a default shield. The minimum level of the regulatory capital is determined by legislation and by regulators, and it is related to the amount of bank assets.

perceptions regarding the riskiness of their business (Rivard, et al., 2003; Beaver & Engel, 1996). In this respect, Anandarajan et al. (2007) found that Australian commercial listed banks use LLP to manipulate their earnings to a much greater extent than non-listed banks do. Likewise, Hess et al. (2009) claim that Australian listed banks have greater incentives to smooth their reported income through LLP relative to their non-listed New Zealand counterparts. Another study conducted by Kanagaretnam et al. (2004) show that bank managers use their discretion on credit loss estimates in order to manage the reported earnings. By analyzing a sample of Spanish banks over the period 1986-2002, Pérez et al. (2008) found that income smoothing through LLP is a popular practice in Spanish banks as well. Income smoothing via LLP is also a common practice, especially among large banks, in the US (Rivard, et al., 2003). Moving the analysis further, Liu and Ryan (2006) distinquish banks between profitable and non-profitable and claim that earnings management is more apparent in profitable banks which have greater incentives to smooth their earnings downwords. In an alternative methodological approach, Lobo and Yang (2001) employed various model specifications[6] to test the income manipulation hypothesis. Their results are economicaly significant and illustrate banks' propensity to use LLP for income smoothing purposes under all the model specifications they employed. On the other extreme, the study of Ahmed et al. (1999) indicates no link between reported LLP and earnings manipulation in banks. The great consistency along with the statistical significance of the results in prior research stipulate that earnings management is a major incentive for choosing accounting practices in banking sector.

Consistent with the results concerning the use of LLP for earnings management, various prior studies have also shown a positive relation between LLP and regulatory capital management in banks. What triggers the manipulation of the regulatory capital in banks is their willingness to be seen by regulators as less risky and more capital adequate (Beaver & Engel, 1996; Hess, et al., 2009; Lobo & Yang, 2001). As Ahmed et al. (1999) show in their research, LLP is used by US banks as a means to manage their regulatory capital. Consistent with the findings of Ahmed et al. (1999), Anandarajan et al. (2007) report some evidence indicating that commercial banks in Australian manipulate their regulatory capital through LLP. Furthermore, Lobo and Yang (2001) claim that banks use LLP as a regulatory capital manipulation tool in their effort to reach the minimum capital requirements. Converserly, Pérez et al. (2008) argue that there is no evidence that Spanish banks use LLP in order to manage their regulatory capital. Analogous to earnings management, current research renders regulatory capital management as a main driver of accounting choices in banks.

The empirical results with regard to the information signaling incentive are quite contradictory. Ahmed et al. (1999) found no evidenve concerning the use of LLP for

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[6] As the authors argue, their study was the first that employed a bank-specific time-series approach. To render their analysis more complete, they also applied models that were used in prior research.

signalling internal information in the US banking sector. In the same way, Anandarajan et al. (2007) claim that there is little or no use of LLP by Australian banks for information signaling purposes. On the other extreme, Lobo and Yang (2001) state that there is a positive relation between LLP and management's intention to signal internal information. According to the authors, this difference is justified by the different model they used to estimate the relation between LLP and signaling incentive. Likewise, Kanagaretnam et al. (2004) argue that banks use LLP to signal private information. Furthermore, their research indicates that the signaling incentive varies across banks. More precisely, they found that undervalued banks have greater incentives to signal internal information than fairly or overvalued banks do. The underlying motive for undervalued banks to signal proprietary information is to raise their market value. As in the case of Lobo and Yang (2001), Kanagaretnam et al. (2004) claim that their information signaling results differ from those in prior studies due to the model they used. As the authors claim, the information signaling tests are sensitive to model specification.

Arguably, earnings and capital management can be identified as core incentives for bank management in choosing accounting treatment. Information signaling incentive, on the other hand, is still a controversial issue in banks. Empirical findings though, have shown that the voluntary adoption of IAS/IFRS has resulted in less income smoothing, less earnings management, more timely recognition of losses, and a higher association between accounting figures, share prices, and returns. In general, under IAS/IFRS the accounting quality and the relevance of accounting numbers has been enhanced and earnings management has been restricted (Barth, et al., 2008). Likewise, Daske and Gebhardt (2006) claim that accounting quality has increased not only in those firms that voluntarily have adopted IFRS, but also in firms for which the adoption was mandatory.

However, the timeliness in recognizing credit losses under both IFRS and US GAAP has been questioned and accused of contributing to the financial crisis. During the financial crisis the accounting treatment of Loan Loss Provisions in both IFRS and US GAAP regimes was based on the incurred loss method. The distinctive characteristic of the incurred loss method is that banks do not recognize loan losses until there is an objective indication that a loan has been impaired (Barth & Landsman, 2010; Beatty & Liao, 2011). Hence, banks would most likely not recognize losses even though there was strong external economic evidence indicating that many borrowers would not be able to pay their debts. Since financial markets base their investment decisions on the disclosed accounting information, such inconsistencies in Loan Loss Provisions recognition could possibly prevent markets from having timely information concerning banks' asset values. Therefore, the incurred loss method has the potential to mitigate the efficiency of market discipline (Barth & Landsman, 2010).

4. Hypotheses development

4.1. Credit losses and stock returns hypothesis

Loan Loss Provisions is an accounting area which characterized by high measurement uncertainty and by high level of professional judgment in its estimation (Anandarajan, et al., 2007; Hess, et al., 2009; Kanagaretnam, et al., 2004; Liu, et al., 1997; Lobo & Yang, 2001; Pérez, et al., 2008; Fonseca & González, 2008). Prior research has shown that bank management's propensity to manipulate earnings and capital by applying professional judgment on Loan Loss Provisions estimation is great (Anandarajan, et al., 2007; Hess, et al., 2009; Kanagaretnam, et al., 2004; Liu & Ryan, 2006; Laeven & Majnoni, 2003; Lobo & Yang, 2001; Pérez, et al., 2008; Rivard, et al., 2003). In addition, whether or not bank managers use Loan Loss Provisions in order to signal internal information to the financial markets is yet a blurry issue. Some of the previous research has shown that undervalued banks have relatively greater incentives to signal proprietary information in order to influence markets' negative perceptions (Kanagaretnam, et al., 2004). Hence, any indication on how equity markets assess banks' realized gains and losses will enhance our understanding of how investors perceive the professional judgment applied on the estimation of LLP by bank managers (Ahmed & Takeda, 1995).

In this respect, Ahmed and Takeda (1995) have shown that in normal periods equity markets evaluate positevly banks' realized gains and losses. In periods where banks face low earnings and regulatory capital, however, such evaluation is significantly less positive. The authors argue that this difference in the valuation of realised gains and losses by investors reflects their concerns regarding bank management's incentives to manipulate earnings and capital. More precisely, any attempt to manage earnings and regulatory capital during periods of uncertainty is perceived by investors as an indication of wider underlying problems in bank's economic position. Although this study is focused on the market valuation of realized gains and losses from investment securities, there is a positive relation between LLP and such realized gains and losses. More explicitly, this positive relation reveals bank managers' propensity to offset the negative effects of LLP on earnings through gains on investment securities (Scholes, et al., 1990).

Liu et al. (1997) move the analysis further by scrutinizing markets' reaction on LLP across different fiscal quarters and across banks with diverse loan default risk. They found that management's discretion resulting in increased LLP is positively assessed by markets only for those banks that seem to be at risk of loan default and only in the fourth quarter. With respect to "good" banks and other fiscal quarters, any increase in LLP is perceived by investors as conveying bad news regarding bank's loan default threat. In addition, this study demonstrates a positive relation between discretionary LLP and future cash flows which is also evaluated positively by investors. Consistent with the findings of Liu et al. (1997), Beaver and Engel (1996) show that management's discretion on the

estimation of credit losses is evaluated positively by capital markets. As they claim, managerial discretion on credit loss estimates is seen by capital markets as conveing internal information about bank's future earnings robustness. In general, stock prices will increase as investors become more optimistic regarding firm's future performance (Campbell & Taksler, 2003). Besides future performance, liquidity[7] on market level is another factor that considerably influences stock returns. Stocks that are more sensitive to market-wide liquidity demonstrate higher expected returns (Pastor & Stambaugh, 2003). In contrast, evidences in the study of Ahmed et al. (1999) indicate a negative relation between LLP and stock returns. The authors claim that investors perceive LLP as an expense rather than as an indicator of future profitability. Finally, Ball and Brown (1968) indicate a very strong and positive relation between income numbers and stock prices. By implication the relation between LLP and stock prices will be significantly negative. Based on the above arguments the stock returns hypothesis is formulated as follows:

H1 a: Any increase in LLP is expected to result in subsequent decrease in the stock returns of the underlying bank. Hence the relation between LLP and stock returns is expected to be negative and significant.

H1 b: The relevance of accounting information relative to equity markets is expected to differ between banks applying IFRS and banks applying US GAAP.

H1 c: Any increase in LLP will have a positive effect on stock markets during "good" times and a negative effect during "bad" times. Hence, it is expected the relation of LLP with stock returns to differ between "good" and "bad" times.

4.2. Credit losses and bond interest rates hypothesis

Bond markets capture two economic aspects: default risk and liquidity (Collin-Dufrense, et al., 2001). As Elton et al. (2004) argue the default probability associated with the bond issuer along with the variation in bonds' recovery rates are core determinants of bond credit spreads[8]. In addition, the authors indicate liquidity as another influential factor of bond returns.

Bond credit spreads are determined by both default and non-default factors. The greatest portion of those credit spreads, however, arises from the default factors (Longstaff, et al., 2005). Likewise, a study by Gebhardt, et al. (2005) indicates default risk as a significant factor of bond pricing. In addition, volatility in expected profits has a positive effect on credit spreads since it is perceived by bond investors as an indication of increased default probability (Campbell & Taksler, 2003). In contrast, Collin-Dufrense et al. (2001) show

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[7] The term "liquidity" signifies the ease to trade large quantities quickly, at low cost and without changing the price (Pastor & Stambaugh, 2003).
[8] The bond credit spreads reflect the additional net yield an investor can earn from a bond which incorporates risk, relative to one that has very low or no risk.

that variables which are included in the default factors are rather weak in explaining bond credit spreads. A variable which can explain a significant portion of bond credit spreads and it is not attributed to the default component of those spreads is liquidity (Chen, et al., 2007; Lin, et al., 2011; Pu, 2009; Longstaff, et al., 2005). Bond liquidity may be influenced by transaction costs, demand pressure and inventory risk in the market, private information, search friction, and short-sale constrains (Pu, 2009). As Longstaff et al. (2005, pp. 2215) claim, bond credit spreads incorporate significant *"individual corporate bond and market wide liquidity dimensions"*. In general, bond markets are less liquid relative to equity markets. Hence, bond investors perceive liquidity as a feature of great importance (Lin, et al., 2011). In this respect, the level of liquidity is a primary concern for actors within bond market. Therefore, any risk associated with bond liquidity is priced by investors (Lin, et al., 2011; Chen, et al., 2007). The correlation between liquidity risk and corporate bond returns is positive and significant (Lin, et al., 2011). High liquidity risk results in less liquid bonds which in turn leads to higher corresponding credit spreads. Regardless of whether the risk is associated with issuer's default probability or with bond's liquidity, investors demand higher returns in order to offset the risk they bear for holding the instrument (Lin, et al., 2011; Chen, et al., 2007). With regard to the relation between accounting figures and credit spreads, Campbell and Taksler (2003) argue that operating income is positively and significantly related to bond credit spreads. Furthermore, the relation between credit ratings and bond interest rates is negative (Gebhardt, et al., 2005). The authors show that bond credit ratings incorporate information regarding the default risk of the referring instrument. In substance, bond credit ratings reflect the creditworthiness of the issuer rather than the quality of the instrument itself (Hull, et al., 2004). As Duffie and Lando (2001) claim, credit spreads indeed reflect bond investors' beliefs regarding the transparency of the issuing firm. It is also evident that bond liquidity is positively related with issuer's credit quality. According to Hull et al. (2004), bonds issued by firms with high credit quality tend to be more liquid than those issued by firms demonstrating low credit quality. Hence, it can be assumed that the relation between LLP and bond credit spreads is positive: the higher the reported LLP is, implying increased credit risk for the issuer, the higher the bond interest rates will be. Thus, the bond interest rate hypothesis will be:

H2 a: Any upward change in LLP will lead to a corresponding increase in bond interest rates, demonstrating a positive and significant relation between LLP and bond interest rates.

H2 b: The relevance of accounting information relative to bond markets is expected to differ between banks applying IFRS and banks applying US GAAP.

4.3. Credit losses and CDS premia hypothesis

The stability of the banking industry is of vital economic importance since banks are the cornerstone of the universal financial system. Consequently, a potential instability in banking industry can threat the entire global economy. In this respect, asset quality problems in banks, particullarly credit losses issues, have often been recognized as main drivers of failure (Hess, et al., 2009).

By definition Credit Default Swaps (CDS) are a type of credit derivatives that provide insurance against a potential default by a specific company or sovereign entity (Hull, et al., 2004). In that sense, CDS premia[9] purely illustrate the default risk associated with the reference entity (Zhang, et al., 2009). CDS is the most popular among all credit derivatives (Blanco, et al., 2005; Pu, 2009; Hull, et al., 2004; Longstaff, et al., 2005; Zhang, et al., 2009). A CDS is identical to an insurance contract that reimburses the buyer for losses which are caused by a default (Longstaff, et al., 2005; Blanco, et al., 2005). More precisely, in a CDS contract the protection buyer makes periodic payments to the protection seller either until the time of the default or until the maturity date of the contract[10]. In any of the two cases, the protection seller is obliged to reimburse the buyer at an amount explicitly specified by the contract (Blanco, et al., 2005; Longstaff, et al., 2005; Norden & Weber, 2004).

The CDS premia for a particular company are determined by its credit quality (Hull, et al., 2004). Specifically in banks, the credit quality is determined by the quality of their loan portfolio. Generally, any increase in banks' LLP is perceived by the financial markets as an indication of increased loan default risk. Only for those banks that are already under high loan default risk a rise in LLP is been seen as conveying good news (Liu, et al., 1997). Hence, it can be assumed that the relation between LLP and CDS premia is positive: the greater the reported LLP are, implying increased loan default probability, the higher the CDS premia would be. In addition, a company's credit quality is also reflected on the credit rating announcements[11] of the three major rating agencies: Standard & Poor's, Moody's, and Fitch (Norden & Weber, 2004). As expected, the relation between CDS premia and a company's credit ratings is negative: the lower the credit rating is, which reflects poor credit quality, the greater the CDS premia are (Hull, et al., 2004). Furthermore, Zhang et al. (2009) argue for a negative relation between a firm's profitability and the corresponding CDS premia. More precisely, their study

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[9] CDS premia incorporate market's perceptions regarding the probability of default by a particular company. The greater the default probability of the reference entity is, the higher the corresponding CDS premia are.
[10] The protection buyers' market is dominated by banks, security houses, and hedge funds. On the other extreme, banks and insurance companies lead the protection sellers' market.
[11] These credit ratings are based on fundamental analysis of the firm, which takes into consideration firm's profitability, liquidity, leverage, management competence, growth opportunities, industry, and competitive advantages and disadvantages (Gebhardt, et al., 2005).

indicates that improved profitability mitigates the likelihood of default which in turn results in lower CDS premia. Consequently, the CDS premia hypothesis will be:

H3 a: Any upward change in LLP will result in corresponding increase in CDS premia, indicating a positive and significant relation between LLP and CDS premia.

H3 b: The relevance of accounting information relative to CDS markets is expected to differ between banks applying IFRS and banks applying US GAAP.

4.4. The relevance of bank accounting data for the decision making needs of equity, bond and CDS markets hypothesis

One of the primary objectives of this study is to examine whether or not the relevance of bank accounting figures differs between the three financial markets of interest. What stimulates the analysis on that level is the fact that the three markets capture different economic aspects[12]. Therefore, it is likely the same accounting information to be assessed differently by the three financial markets due to their varying decision making needs.

In this respect, evidence in the literature indicate that CDS premia tend to respond faster to changes in the credit condition of the underlying company than bond credit spreads do. More precisely, Blanco et al. (2005) argue that even though CDS and bond markets evaluate credit risk equally over time, CDS premia adapt relatively more quickly to credit changes in the short-run. Likewise, Zhu (2006) show that in the long-run credit risk is priced similarly by both bond and CDS markets. In short-term, though, CDS premia demonstrate faster response to changes in the credit quality of the refference entity compared to bond credit spreads. Prior research also indicates that CDS markets' reaction to new information regarding the credit quality of the reference entity is preceding that of equity markets. Findings in the research conducted by Norden and Weber (2004) reveal that CDS markets respond to negative credit rating reviews well ahead of the equity markets. According to the authors, the variation in the response time between CDS and equity markets could be traced in the underlying pricing motives of these two financial markets. While equity market considers various factors such as liquidity and future performance, CDS market is totally concentrated on a company's default risk. The same justification could apply for explaining the response discrepancies between CDS and bond markets as well.

The information conveyed in LLP is primarily related with the probability of default (Hess, et al., 2009). Thus, the hypothesis for testing whether or not the relevance of bank accounting numbers differs between equity, bond, and CDS markets has the following form:

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[12] See sections 4.1, 4.2 and 4.3 for evidence.

H4: Bank LLP is expected to be of higher value relevance with respect to the decision making needs of CDS market compared to equity and bond markets.

5. Bank sample and dataset

In this section are presented the bank population along with the dataset used in the study, as well as the criteria which are applied for drawing the final study sample.

5.1. Bank sample

The population of the study is all banks in Bankscope[13] that apply IFRS or US GAAP[14] and have Total Assets greater than 1 billion €, over the period 2005-2011[15]. The initial sample was consisted of 8367 banks under IFRS and 13820 banks under US GAAP. After applying the selection criteria, the sample is reduced to 621 and 591 banks respectively. Any missing values are collected either from Datastream[16] or from bank annual reports. In cases where it is not possible to fill missing observations, the banks are excluded from the sample. The bank sample can further vary, depending on what measure is used[17]. Finally, from the sample are excluded the central banks of all countries. Table 1 summarizes the study sample.

5.2. Dataset

Five datasets are used for the purpose of the study:

- Reported credit losses.
- Date of fourth quarter financial information disclosure.
- Stock returns.
- Bond credit spreads.
- CDS premia.

5.2.1. Inclusion criteria

In order for a bank to be included in the study sample, the following criteria must be satisfied:

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[13] Bankscope is a comprehensive global database of banks' financial statements, ratings, and intelligence. Bankscope contains comprehensive information on banks across the globe. It can be used to research individual banks and find banks with specific profiles and analyze them. Bankscope has up to 16 years of detailed accounts for each bank (www. bankscope2.bvdep.com).

[14] Only US banks that apply US GAAP will be used in the study (see section 2.2.).

[15] Two are the reasons for choosing this specific time period. First, in 2005 the application of IFRS became mandatory for E.U. listed firms. Second, when this study started, 2011 was the last year with available accounting information.

[16] Datastream is a comprehensive database owned by Thomson Reuters and which provides access to a vast amount of financial data over a fifty-year period (www.thomsonreuters.com).

[17] The reason for the sample of the banks to vary is that some banks are listed on the stock market, some have listed bonds, and some have CDS.

- reported Loan Loss Provisions by Bankscope over the period 2005-2011[18]
- daily stock prices, bond credit spreads and CDS premia reported by Datastream over the period 2005-2011
- dates of 4Q accounting information disclosure, at least for three years[19], over the period 2005-2011

5.2.2. Reported credit losses

Loan Loss Provisions is the account that mirrors management's anticipated credit losses on bank financial statements. In this respect, this study will employ the reported LLP as a proxy for bank credit losses. This accounting information is obtained by Bankscope. After searching in Bankscope for banks with reported LLP across 2005-2011, 547 banks under IFRS and 531 under US GAAP were found.

5.2.3. Date of fourth quarter financial information disclosure

The information regarding the date of the disclosure of the fourth quarter accounting figures is obtained manually from banks' web pages. The financial information contained in the 4Q release is the same as in the annual report.

5.2.4. Stock returns

Annual stock returns, which are calculated by using daily stock prices obtained from Datastream, are used as proxies for the cost of equity capital. The exact data type used in this study is Datastream's *"Adjusted-Default Price"*. As stated in the database, this data type is the default for all equities and represents the official closing price. It is also the default price which is offered in all research programs. The use of stock returns as dependent variable is consistent with the market-adjusted returns employed by Ahmed et al. (1999) for testing the market valuation of discretionary LLP. The underlying reason for choosing stock returns instead of the market value of equity is because the estimated coefficients in such models are significantly less biased. The disadvantage of models using stock prices as dependent variables, however, is that they produce more heteroscedastic standard errors rendering the statistical inference problematic. This potential problem, though, can be overcome by applying the White's test for heteroskedasticity (Kothari & Zimmerman, 1995). In modern econometrics software (e.g. STATA) heteroskedasticity is not a matter of concern since they integrate the White's test (Stock & Watson, 2012). From the banks which fulfill the preconditions discussed in

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[18] Following the literature, this study obtains all the relevant data from Bankscope instead of the annual reports. The data drawing from databases is the most common practice in research. Furthermore, when two or more observations are missing, the bank is dropped from the sample. This is done in order to ensure that the panel data sets will be as much balanced as possible. The more balanced a panel data set is, the higher the quality of statistical results will be (Stock & Watson, 2012).

[19] The banks for which such information is not available for three or more years are excluded from the study sample in an effort to increase the quality of the statistical results.

sections 5.1, 5.2.1 and 5.2.2., 114 banks under IFRS and 87 under US GAAP are found to be listed in the stock market.

5.2.5. Bond credit spreads

The bond data used in this study are daily and are drawn from Datastream. According to Datastream, the credit spreads are calculated by comparing the bond interest rates with the equivalent government benchmark bond. These credit spreads are expressed in terms of yield difference (bond minus benchmark) in basis points. Only straight bonds with fixed coupon payments are included in the sample (Campbell & Taksler, 2003; Collin-Dufrense, et al., 2001; Elton, et al., 2004; Lin, et al., 2011; Hull, et al., 2004; Longstaff, et al., 2005; Blanco, et al., 2005). This is done in order to eliminate potential pricing differentials (Blanco, et al., 2005). From the sample are also excluded bonds that are close to their maturity since such bonds demonstrate very low liquidity and high risk for pricing errors (Lin, et al., 2011)[20]. In addition, credit spreads from actual trading bid/ask quotes instead of matrix prices are used. The reason is that matrix prices are less reliable than actual traders quotes (Gebhardt, et al., 2005). After applying the criteria and controlling for missing observations over the period 2005-2011, 44 IFRS and 27 US GAAP banks with listed bonds were found.

5.2.6. CDS premia

All the data regarding the CDS premia are collected through Datastream. For the purpose of the analysis it is used the mid-rate spread between the entity and the relevant benchmark curve. This mid-rate, which is expressed in basis points, is the default data type in Datastream. The mid-rate data type employed in this study is consistent with the one used in prior literature (Hull, et al., 2004; Longstaff, et al., 2005; Norden & Weber, 2004; Blanco, et al., 2005). In addition, only CDS with five years maturity are included in the sample since they are by far the most liquid and popular in the market (Blanco, et al., 2005; Hull, et al., 2004; Longstaff, et al., 2005; Norden & Weber, 2004; Zhang, et al., 2009). Furthermore, all CDS which are related to subordinated debt are excluded. The reason is that such contracts are less appropriate in pricing credit risk relative to senior debt CDS contracts[21] (Zhang, et al., 2009). After searching for relevant CDS data and controlling for missing observations over the period 2005-2011 on a daily basis, 43 banks following IFRS, and 5 US banks following US GAAP with CDS contracts are traced.

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[20] Lin et al. (2011) exclude from their sample bonds with less than one year to maturity in order to eliminate both the potential implications of low liquidity and the risk of pricing errors. The current study, though, excludes bonds with less than two years to maturity to further mitigate such potential problems.

[21] In the case of default, subordinated debt holders will get paid only after senior debt holders are fully compensated. Therefore, subordinated CDS contracts are usually traded with higher premia than senior CDS do.

Table I: Summary of study sample.

Note: The countries following IFRS are those for which the application of the IASB's standards set became mandatory for all listed entities after 01/01/2005. These countries are all E.U. members, Australia, South Africa, and Turkey (www.ifrs.org). In addition, banks from Norway and Switzerland that apply IFRS are also included in the study sample although the adoption of IFRS is not mandatory in these two countries. Conversely, from the study sample are excluded banks from countries for which it was difficult to obtain information concerning the quality of their banking sector (e.g. Russian Federation).

Country	Accounting Standards	Banks with Equity	Banks with Bonds	Banks with CDS
Australia	IFRS	6	3	3
Austria	IFRS	2	3	1
Belgium	IFRS	2	0	2
Cyprus	IFRS	3	0	0
Czech Republic	IFRS	1	0	0
Denmark	IFRS	4	5	1
Finland	IFRS	2	0	0
France	IFRS	13	5	4
Germany	IFRS	6	17	7
Greece	IFRS	5	0	1
Hungary	IFRS	1	0	0
Ireland	IFRS	2	0	1
Italy	IFRS	16	2	4
Luxemburg	IFRS	1	0	0
Malta	IFRS	2	0	0
The Netherlands	IFRS	1	0	2
Norway	IFRS	9	4	0
Poland	IFRS	7	0	0
Portugal	IFRS	4	0	2
Slovakia	IFRS	1	0	0
South Africa	IFRS	4	0	0
Spain	IFRS	6	4	4
Sweden	IFRS	4	0	4
Switzerland	IFRS	3	0	1
Turkey	IFRS	3	0	0
United Kingdom	IFRS	6	1	6
The United States	US GAAP	87	27	5
Total		201	71	48

6. Methodology and modeling approach

6.1. Methodology

The way the research in this study is designed along with the characteristics of the data result in three distinct sets of panel data, one for each metric used. In econometrics, panel data is the combination of time-series and cross-sectional data. The most appropriate econometric model for testing hypotheses with panel data is the so called *"fixed-effects*

model" (Stock & Watson, 2012). The fixed-effects model has two main characteristics. First, it combines time and firm-specific data in a simple pooled time-series cross-sectional OLS regression. Second, it is assumed in this model that the residuals are consisted by two different types of fixed-effects: the *"entity fixed-effects"* which varies between entities but is constant across time, and the *"time fixed-effects"* which varies across time but is constant between entities (Lobo & Yang, 2001). By applying a fixed-effects model we circumvent the inconvenience of estimating and interpreting different entity-by-entity regressions. Furthermore, under this model it is ensured that the residuals are not heteroscedastic, rendering the statistical inference efficient, unbiased, and consistent. In addition, a fixed-effects model controls for omitted variable bias[22], making the coefficients in the explanatory variables unbiased and consistent. The fixed-effects model, however, incorporates a hypothetically undesirable characteristic. Since it controls for omitted variable bias, it is likely to exclude a powerful explanatory variable of interest from the model (Beaver, et al., 1989). According to Lobo and Yang (2001, pp. 231), the fixed-effects regression *"is easy to estimate, is parsimonious, treats individual differences in a simple, systematic way, and allows for tests of them"*.

6.2. Modeling approach

As discussed previously, this study incorporates three different metrics for evaluating the accounting quality in banks. Driven by this fact, the paper employs three distinct econometric models for testing the hypotheses imposed in section 4. These models are presented in the subsequent sections.

6.2.1. The econometric model for testing the equity hypothesis

To test the equity hypothesis this study follows the reasoning of Ball and Brown (1968) for assessing the value of accounting information relative to the decision making needs of security markets[23]. The form of the model for testing the equity hypothesis in the current paper is:

$$ASR_{i,t-1} = \beta_0 + \beta_1 \Delta LLP_{i,t} + \beta_2 IFRS_{i,t} + \beta_3 \Delta LLP_{i,t} * IFRS_{i,t} + \beta_4 Good\ Times_{i,t} + u_{i,t}$$

Where:

ASR represents the annual abnormal stock returns of the previous year as they estimated based on the date of the 4Q accounting information disclosure. The ASR is estimated through the following equation:

$$ASR = Actual\ Stock\ Returns - Expected\ Stock\ Returns.$$

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[22] Omitted variable bias is the major threat to internal validity for an econometric model. In a fixed-effects model, omitted variable bias may arise from unobserved variables that are either constant between entities and vary across time or from factors that are constant across time and vary between entities.

[23] For more information see Ball and Brown (1968).

In this equation, Actual Stock Returns[24] are the annual returns calculated by bank stock prices and Expected Stock Returns[25] are the annual market returns estimated by the market index[26].

ΔLLP represents the difference between current and previous year in the reported loan loss provisions of all banks (both IFRS and US GAAP banks).
IFRS represents a dummy variable taking value 1 if bank applies IFRS and 0 otherwise.
ΔLLP*IFRS is an interaction term which allows the effect of ΔLLP on ASR to depend on IFRS.
Good Times represents a dummy variable taking value 1 for the years 2005-2007[27], and 0 otherwise.
u represents the error term.

6.2.2. The econometric model for testing the bond hypothesis

To test the bond credit spreads hypothesis, this paper employs the model from the study conducted by Collin-Dufrense et al. (2001) for explaining the determinants of credit spreads[28]. The model in the present research has the following form:

$$\Delta BCS_{i,t} = \beta_0 + \beta_1 \Delta LLP_{i,t} + \beta_2 IFRS_{i,t} + \beta_3 \Delta LLP_{i,t} * IFRS_{i,t} + u_{i,t}$$

Where:

ΔBCS represents the difference between current and previous year in the annualized bond credit spreads based on the date of the 4Q accounting information disclosure.
ΔLLP represents the difference between current and previous year in the reported loan loss provisions of all banks (both IFRS and US GAAP banks).
IFRS represents a dummy variable taking value 1 if bank applies IFRS and 0 otherwise.

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[24] In the process of estimating the annual stock returns, as date *"t"* is used the date of current year's 4Q disclosure, while as date *"t-1"* the day after previous year's 4Q disclosure. In cases, however, where previous year's 4Q date is missing, then as *"t-1"* is used the same date as *"t"* but for one calendar year back. The latter process is followed only when the 4Q date is missing for one year. When 4Q dates for two consecutive years are missing, then the second year is dropped. The same reasoning is applied for estimating the expected stock returns; the annual bond credit spreads as well as the annual CDS premia.
[25] The use of the market returns as the Expected Stock Returns in the formula is not the most appropriate since additional factors, e.g. risk, must be considered in the estimation process. Based on the demands of the present study, however, the use of market returns as a proxy for the Expected Stock Returns is adequate.
[26] The indices used for estimating the market returns are the main benchmark indices of the major stock exchanges from each country in the sample. The information regarding the benchmark indices is obtained by Bloomberg and the relevant data are obtained by Datastream. More appropriate, though, would be to use the bank indices instead of the main benchmark indices. The reason for not using the bank indices is that Datastream does not have such information for all the countries in the study sample.
[27] The years 2005-2007 are perceived as "good times" since they are the years before the financial crisis and the years between 2008 and 2011 as "bad times" since they are the years after the financial crisis.
[28] For more information see Collin-Dufrense et al. (2001).

ΔLLP*IFRS is an interaction term which allows the effect of ΔLLP on ASR to depend on IFRS.

u represents the error term.

6.2.3. The econometric model for testing the CDS hypothesis

For the CDS hypothesis testing is applied the same modeling specification as in the study of Collin-Dufrense et al. (2001)[29]. The model for testing the CDS hypothesis is:

$$\Delta CDS_{i,t} = \beta_0 + \beta_1 \Delta LLP_{i,t} + \beta_2 IFRS_{i,t} + \beta_3 \Delta LLP_{i,t} * IFRS_{i,t} + u_{i,t}$$

Where:

ΔCDS represents the difference between current and previous year in the annualized CDS premia based on the date of the 4Q accounting information disclosure.

ΔLLP represents the difference between current and previous year in the reported loan loss provisions of all banks (both IFRS and US GAAP banks).

IFRS represents a dummy variable taking value 1 if bank applies IFRS and 0 otherwise.

ΔLLP*IFRS is an interaction term which allows the effect of ΔLLP on ASR to depend on IFRS.

u represents the error term.

6.2.4. The econometric model for testing the fourth hypothesis.

The purpose of the fourth hypothesis is to examine whether or not the relevance of bank accounting information differs between the three markets. Such a hypothesis testing can be made either by running three regressions separately or by running three regressions simultaneously[30]. The characteristics of the present study render the use of the simultaneous equation model for testing *H4* more appropriate. To be more specific, it is evident from the literature review that substantial interactions between equity, bond, and CDS markets are apparent[31]. This conclusion raises the belief that the related error terms to the three dependent variables are correlated with each other. In econometrics, the most appropriate model for testing two or more equations simultaneously when the error terms in these equations are correlated is Zellner's seemingly unrelated regressions (SUR). The advantage of SUR is that it allows the modeling of several variables that are closely related over time (Brooks, 2008). In practice, though, the application of a SUR model for testing *H4* is insufficient for two reasons. First, the necessary condition for using a SUR model that the number of the time-series observations *T* are equal or greater than the number of the cross-sectional units *N* is not satisfied (Brooks, 2008). Second, the three

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[29] Although this model was used for explaining the determinants of bond credit spreads, the identical characteristics of bond and CDS markets render the use of this model for testing H3a and H3b appropriate.

[30] This is known as simultaneous equations model.

[31] These interactions are more powerful between CDS and bond markets and less strong between equity and, bond and CDS markets.

data sets used in the study are not balanced. The result of using a SUR with unbalanced panel data is to lose important information since all the observations that are not balanced between the equations are dropped (McDowell, 2004). Consequently, the testing of *H4* is made by running three similar regressions separately. Important to note is that the insufficiency of not using a SUR is mitigated by the fact that the independent variables in the three equations are the same[32].

The fourth hypothesis is tested through the model employed by Collin-Dufrense et al. (2001). The form of the regression in the present study is:

$$\Delta Y_{i,t} = \beta_0 + \beta_1 \Delta LLP_{i,t} + u_{i,t}$$

Where:

ΔY represents the difference between current and previous year in the dependent variable (abnormal stock returns, CDS premia and bond credit spreads respectively) based on the date of the 4Q accounting information disclosure.
ΔLLP represents the difference between current and previous year in the reported loan loss provisions of all banks (both IFRS and US GAAP banks).
u represents the error term.

7. Descriptive statistics and empirical results

Driven by the fact that the study uses three distinct sets of panel data, the descriptive statistics along with the empirical results with regard to each dataset are presented separately for greater convenience.

7.1.1. Descriptive statistics for the dataset of listed banks

Table II presents the aggregate and year-by-year descriptive statistics for the sub-sample of listed banks. From the aggregate statistics we can see that the mean and the median of the abnormal stock returns is -.058 and -.081 respectively and the standard deviation is .302. Concerning *ΔLLP*, it demonstrates a mean of .107 and a median of .0042. The standard deviation of this independent variable is 1.379. Furthermore, the mean and the standard deviation of the dummy variable *IFRS* is .567 and .497. Finally, the correlation between *ASR* and *ΔLLP* is -0.159 and between *ASR* and *IFRS* is 0.120. Graph I provides a graphical illustration of the correlation between *ASR* and *ΔLLP*.

From the year-by-year statistics it can be seen that *ΔLLP* illustrate its higher mean, median and max values in the years 2008 and 2009. On the other hand, in 2008 *ASR* demonstrates its lower mean and median amounts. These findings can be justified by the outbreak of the financial crisis somewhere between the late 2007 and the early 2008. The

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[32] According to STATA's base reference manual, when the independent variables in two or more equations are the same, the results from a SUR model are almost identical to those derived when running the regressions separately.

crisis forced the majority of banks worldwide to recognize significant credit losses. This unpleasant situation had a substantial negative impact on bank stock prices. Stock markets, though, reacted after the eruption of the crisis. In addition, the correlation between *ΔLLP* and *ASR* is positive in 2006 and in 2007 and negative for the years 2008-2011. If we assume that the years 2006 and 2007 are before the crisis, this result is consistent with findings in prior research indicating that during good times *LLP* and stock returns are positively correlated. This result, though, does not provide any indication regarding the significance of the correlation. Whether the correlation between *LLP* and *ASR* is significant or not will be tested through a fixed-effects regression in section 7.1.2.

Table II

Note: Descriptive statistics for the sub-sample of 201 listed banks over 2005-2011 that (1) have LLP data available on Bankscope and (2) have stock price data available on Datastream. In addition, the 1% upper values of ASR are dropped in order to have more representative descriptive statistics. In Appendix 1 are presented the descriptive statistics including the dropped 1% upper values of ASR.

Aggregate summary statistics									
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ASR	1048	-.058	.302	-.967	-.215	-.081	.064	1.381	1.000
ΔLLP	1182	.107	1.379	-12.435	-.009	.0042	.055	15.006	-0.159
IFRS	1206	.567	.497	0	—	—	—	1	0.120

Year-by-year summary statistics									
2006									
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ASR	99	-.006	.189	-.526	-.113	-.081	.075	.686	1.000
ΔLLP	185	.031	.225	-1.605	-.005	.00013	.012	1.415	0.119
IFRS	201	.567	.497	0	—	—	—	1	0.237
2007									
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ASR	176	-.033	.187	-.411	-.143	-.081	.050	.860	1.000
ΔLLP	197	.121	.598	-.399	.00027	.0075	.0458	6.719	0.037
IFRS	201	.567	.497	0	—	—	—	1	0.189
2008									
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ASR	184	-.135	.0171	-.504	-.249	-.142	-.049	.721	1.000
ΔLLP	198	.521	1.716	-.018	.012	.038	.256	13.579	-0.110
IFRS	201	.567	.497	0	—	—	—	1	0.126
2009									
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ASR	199	-.061	.279	-.792	-.213	-.091	.095	.719	1.000
ΔLLP	200	.589	1.790	-.817	.0099	.049	.274	15.006	-0.247
IFRS	201	.567	.497	0	—	—	—	1	-0.192

Table II

Continued

2010

Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ASR	190	.014	.504	-.914	-.370	-.057	.330	1.381	1.000
ΔLLP	201	-.413	1.474	-12.435	-.188	-.019	.0019	1.403	-0.259
IFRS	201	.567	.497	0	—	—	—	1	0.390

2011

Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ASR	200	-.099	.270	-.967	-.230	-.098	.047	1.045	1.000
ΔLLP	201	-.206	1.340	-10.916	-.079	-.013	.0018	5.017	-0.088
IFRS	201	.567	.497	0	—	—	—	1	-0.005

Graph I
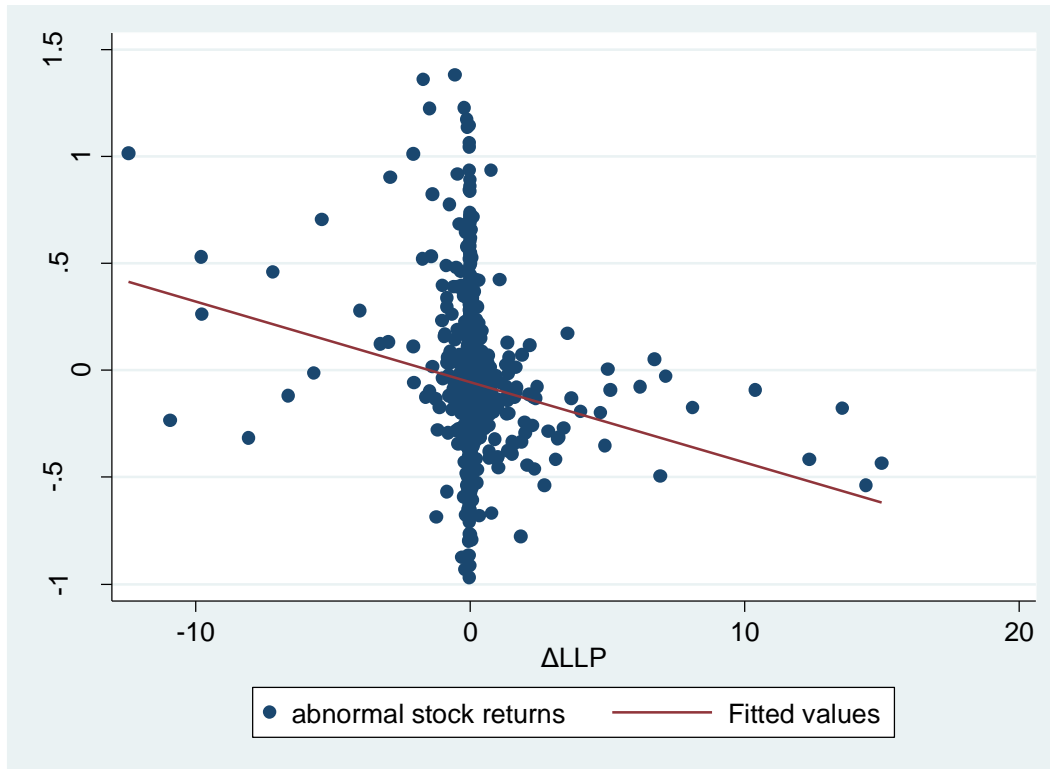
7.1.2. Empirical results

Table III presents the results of the regression discussed in section 6.2.1. The significance of the coefficient estimates is determined by using clustered standard errors[33]. As

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[33] As discussed in section 5.2.4., heteroskedasticity in standard errors can render the statistical inference misleading. Therefore, it is vital for the robustness of the results to correct the heteroskedasticity in standard errors. The reason for being beware of having correct standard errors is because they influence the t-statistics. T-statistics are estimated by dividing the coefficient estimate by the S.E. ($\frac{Coefficient}{standard\ error}$). Heteroscedastic S.E. are usually smaller than the corrected ones and consequently the estimated t-statistics

expected from *H1a*, the estimated coefficient on *ΔLLP* is negative (-.0447) and it is significant at the 1% significance level. This result is in line with findings in prior research, indicating that equity investors perceive bank loan loss provisions more as an sign of underlying problems rather than as a signal of future strength.

At this point, it is important to note that the coefficient on *IFRS* could not be estimated by using a fixed-effects (F.E.) regression. The reason is because *IFRS* is a variable which is constant across entities and since F.E. regression controls for such unobserved variables the *IFRS* is omitted by STATA[34] due to collinearity. The coefficient on *IFRS* could alternatively be estimated through a random-effects regression. Random-effects (R.E.) regression, though, differs substantially from F.E. regression since it does not control for omitted variable bias. Therefore, the use of R.E. regression instead of F.E. is not always appropriate. To check whether or not the coefficient estimates produced by a R.E. regression do not significantly differ from those produced by a F.E. regression we can use the Hausman test[35]. The results of the Hausman test indicate that the coefficient estimates from the two models differ significantly rendering inappropriate the use of R.E. regression[36]. The importance of the variable *IFRS* for the purpose of the analysis, however, leads to the use of R.E. regression for estimating the coefficient on *IFRS*. The coefficient on *IFRS* is .0953 and it is significant at the 1% significance level. The positive sign on *IFRS* indicates that IFRS banks demonstrate slightly higher abnormal stock returns relative to US GAAP banks. However, the fact that the coefficient is estimated by an inappropriate model must make us cautious concerning the interpretation of the result. Furthermore, the coefficient on *ΔLLP*IFRS* is -.0597 and it is significant at the 1%. Consistent with *H1b*, this finding indicates that a significant difference in terms of relevance between the two standard frameworks is apparent. Regarding the coefficient estimate on *Good Times*, it is insignificant at all conventional levels (1%, 5%, and 10%), indicating no substantial difference in the abnormal stock returns trend before and after the crisis. When the time fixed-effects is included in the regression, no significant deviation is caused in the results. The only difference can be traced on R^2 which after the inclusion of the time fixed-effects is increased from 3.62% to 9.29%. Nevertheless, the absence of market liquidity controls may add noise to the empirical findings.

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are higher. As a result, it is likely a hypothesis not to be rejected by mistake. In panel data we control for heteroskedasticity by clustering the S.E. The benefit of the clustered S.E. is that it allows us to control for heteroskedasticity and at the same time to control for autocorrelation within entities while treating the S.E. as uncorrelated across entities (Stock & Watson, 2012). The clustered standard errors are applied to all the regressions in this study.

[34] STATA is the econometrics software used for the analysis in this study.

[35] The Hausman test tells us whether or not the random-effects coefficient estimates are similar to the fixed-effects coefficients. If the estimated coefficients are similar, then the use of R.E. regression instead of F.E. regression is appropriate. A large and significant Hausman statistic indicates a significant difference between the two models, rendering the use of R.E. regression instead of F.E. regression inappropriate.

[36] See Appendix 2.

Table III

Note: Empirical results regarding H1a, H1b and H1c. *T*-statistics are shown in parentheses. (***) Indicates significance at the 1% level. The coefficient on IFRS is estimated by using a random-effects regression. The coefficient estimates on ΔLLP, ΔLLP*IFRS and Good Times are estimated through a fixed-effects regression. From the regressions are not dropped the 1% upper values of ASR which were excluded from the descriptive statistics since these values are important for the econometric analysis. Base year: 2006.

Independent variables	Coefficient estimates	R^2
ΔLLP	-.0447***	
	(-5.02)	
IFRS	.0953***	
	(4.46)	9.29%
ΔLLP*IFRS	-.0597***	
	(-2.87)	
Good Times	-.00628	
	(-0.36)	

7.1.3. Robustness check

Even though the results regarding the sign and the significance of the main explanatory variable are as it was expected to be from *H1a*, a robustness test will be made to confirm these results. In this respect, the same model but with the actual stock returns as the dependent variable will be used. The empirical findings from the robustness test are identical to those from the initial model. The coefficient estimate on *ΔLLP* is negative (-.0926) and it is significant at the 1% significance level (t-statistics: -4.76).

7.2.1. Descriptive statistics for the dataset of banks with listed bonds

Table IV presents the aggregate and year-by-year descriptive statistics for the sub-sample of banks with listed bonds. On the aggregate level, the mean, the media and the standard deviation of *ΔBCS* is .030, .120, and 1.558 respectively. Concerning *ΔLLP* variable, it has mean .176, median .017, and S.D. 2.132. Moreover, the dummy variable IFRS demonstrates a mean of .620 and a standard deviation of .486. With regard to the correlation between *ΔBCS* and *ΔLLP* is -0.062, while the correlation between *ΔBCS* and *IFRS* is 0.027. A graphical illustration of the correlation between *ΔBCS* and *ΔLLP* is provided in Graph II.

As can be seen from the year-by-year statistics, in 2007 *ΔBCS* has its higher mean value. The significant increase in *ΔBCS* between 2006 and 2007 can be explained by the financial crisis. Evidently, there are indications that the increased default risk associated with the crisis was anticipated by bond markets. Also interesting to note is the sharp decrease in the mean of *ΔBCS* from 1.691 in 2007 to .0007 in 2008. A potential explanation to this controversial result could be the involvement of E.U. and U.S. government for stabilizing the financial system. Furthermore, in 2009 *ΔLLP* demonstrates its higher mean value (1.191) across all studied years. On the other hand, 2009 is the year with the lower mean for *ΔBCS*. During this year *ΔLLP* displays its higher max value and

ΔBCS its lower min value. These findings could also be explained by the state involvement aiming at stabilizing the banking industry.

Table IV

Note: Descriptive statistics for the sub-sample of 71 banks with listed bonds over 2005-2011 that (1) have LLP data available on Bankscope and (2) have bond credit spreads data available on Datastream. In addition, the 1% upper and down values of ΔBCS are dropped in order to have more representative descriptive statistics. In Appendix 3 are presented the descriptive statistics including the dropped 1% upper and down values of ΔBCS.

Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
Aggregate summary statistics									
ΔBCS	357	.030	1.558	-5.105	-.721	.120	.715	5.452	1.000
ΔLLP	411	.176	2.132	-12.434	-.067	.017	.274	14.44	-0.062
IFRS	426	.620	.486	0	—	—	—	1	0.027
Year-by-year summary statistics									
2006									
ΔBCS	36	-.422	.801	-3.564	-.542	-.220	-.006	.439	1.000
ΔLLP	57	.051	.333	-1.605	-.011	.006	.076	1.374	0.014
IFRS	71	.619	.489	0	—	—	—	1	-0.415
2007									
ΔBCS	56	1.691	1.321	-.661	.636	1.596	2.522	5.451	1.000
ΔLLP	70	.277	.916	-.399	0	.033	.126	6.72	0.098
IFRS	71	.619	.489	0	—	—	—	1	-0.061
2008									
ΔBCS	58	.0007	1.747	-3.548	-1.082	-.075	.762	3.864	1.000
ΔLLP	71	1.159	2.591	-.012	.08	.349	.907	13.579	-0.088
IFRS	71	.619	.489	0	—	—	—	1	-0.310
2009									
ΔBCS	68	-1.61	1.394	-5.105	-2.393	-1.323	-.758	1.222	1.000
ΔLLP	71	1.191	2.351	-.729	.0379	.339	1.316	14.44	0.027
IFRS	71	.619	.489	0	—	—	—	1	0.629
2010									
ΔBCS	70	.212	.770	-2.310	-.063	.283	.644	1.907	1.000
ΔLLP	71	-.965	2.279	-12.435	-.912	-.374	-.036	2.104	-0.152
IFRS	71	.619	.489	0	—	—	—	1	-0.161
2011									
ΔBCS	69	.380	.799	-2.636	.046	.426	.719	3.381	1.000
ΔLLP	71	-.684	2.04	-10.916	-.524	-.123	.0012	1.88	0.085
IFRS	71	.619	.489	0	—	—	—	1	0.145

Graph II
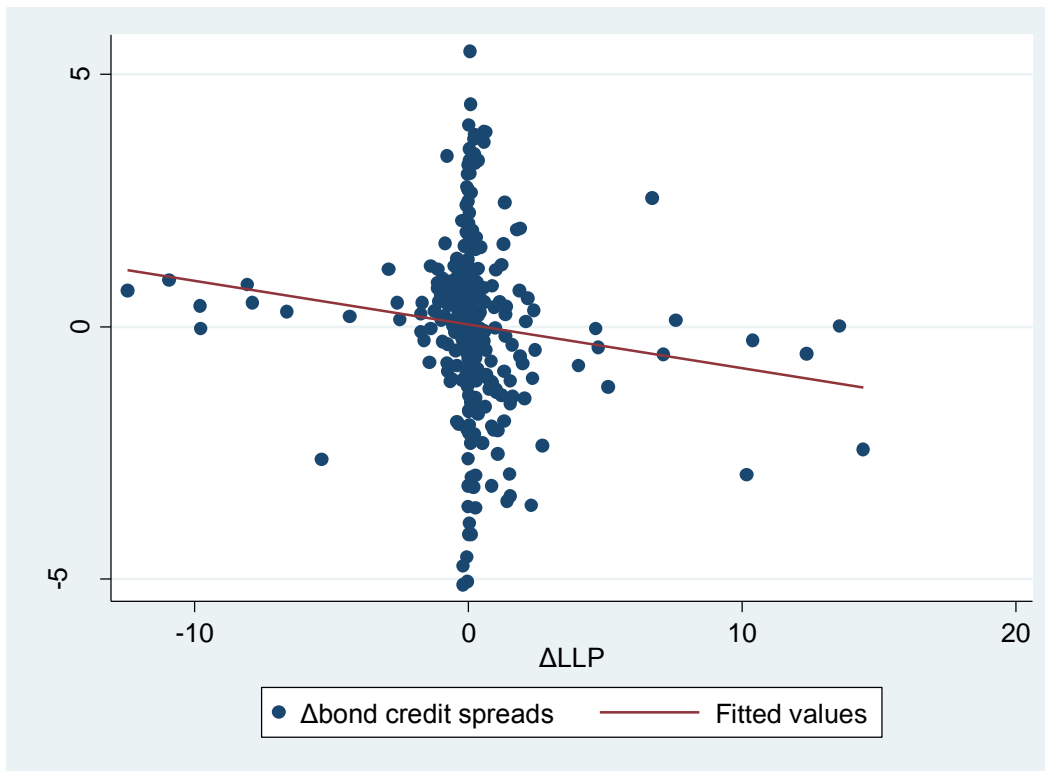
7.2.2. Empirical results

The empirical results of the regression for testing *H2a* and *H2b* are mirrored on Table V. The coefficient on *ΔLLP* is -.0896 and it is significant at the 1% level. As can be seen, the sign on the coefficient is not the expected one from *H2a*. These results point out two interesting conclusions. First, the significance of the coefficient estimate renders LLP as an important variable in explaining the variation in bank bond credit spreads. Second, and more important, the negative sign stipulates that LLP is one among various factors (both on firm and on macroeconomic level) that bond markets consider when assessing the credit quality of banks. The coefficient on *IFRS* is estimated through a random-effects regression[37]. The results of the Hausman test show that it is appropriate to use a random-effects regression instead of a fixed-effects regression for estimating the *IFRS* variable (see Appendix 4). The coefficient estimate on *IFRS* is .1787 and it is significant at 5% significance level. This finding indicates a significant difference in bond credit spreads between banks applying IFRS and banks applying US GAAP. Specifically, the positive sign on the coefficient denotes that IFRS banks exhibit higher bond credit spreads than US GAAP banks do. In addition, the coefficient on *ΔLLP*IFRS* is -.1603 and it is significant at the 10% level. In line with *H2b*, this result reveals a deviation in the

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[37] For justification see section 7.1.2.

accounting quality between IFRS and US GAAP banks. This difference in the relevance, however, is marginally significant.

When the time fixed-effects is included in the regression the coefficient estimate on ΔLLP becomes insignificant at all conventional levels (t-statistics: -1.14, p-value: 0.257). This substantial change on the coefficient leads to the conclusion that bond credit spreads are influenced by time varying variables. One such variable is the financial crisis. Hence, in an effort to control for this specific time varying factor the dummy variable *Good Times* is included in the F.E. regression. The coefficient on *Good Times* is positive (1.449) and significant at the 1% significance level (t-statistics: 3.59). Interesting to note is that the explanatory power of the model is increased when the dummy *Good Times* is included in the regression (R^2 is increased from 0.44% to 4.77%). This result stipulates a significant difference in the trend of bond markets between the years before and after the crisis rendering this specific financial event a significant variable in explaining the variation in bond credit spreads. More precisely, the positive sign on the coefficient denotes that in 2006 and in 2007 bond credit spreads exhibited an upward trend. In addition, the positive coefficient indicates that before the crisis the correlation between ΔBCS and ΔLLP was positive. In order to control for the correlation between ΔBCS and ΔLLP before the crisis, the interaction term $\Delta LLP*Good Times$ is included in the F.E. regression. As expected the coefficient estimate on $\Delta LLP*Good Times$ is positive (.2867) stipulating that before the financial crisis the variables ΔBCS and ΔLLP were positively correlated. The coefficient, however, is insignificant at all conventional levels (t-statistics: 1.39). What can be inferred by these results is that the crisis had indeed a significant effect on the correlation sign between bond credit spreads and LLP, but did not affect at all the significance of LLP in explaining the variation in bond markets. This finding stimulates the interest to check the correlation for the years after the crisis as well. Therefore a new dummy variable *Bad Times*[38] is included. The estimated coefficient on *Bad Times* is negative and significant at the 1%. The findings regarding the two dummy variables indicate that the unexpected negative coefficient on ΔLLP has its origin in the financial crisis or in other time varying factors related to the crisis (e.g. economic growth). At this point it is important to state that the absence of firm-specific and market-wide liquidity controls from the regression may add noise to the empirical results regarding bond credit spreads.

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[38] The dummy variable Bad Times takes value 1 for the years 2008-2011, and 0 otherwise.

Table V

Note: Empirical results regarding the main variables of the regression for testing H2a and H2b. *T*-statistics are shown in parentheses. (***) Indicates significance at the 1% level, (**) indicates significance at 5% level and (*) indicates significance at 10%. The coefficient on IFRS is estimated by using a random-effects regression. The coefficient estimates on ΔLLP and on ΔLLP*IFRS are estimated through a fixed-effects regression. From the regressions are not dropped the 1% upper and down values of ΔBCS which were excluded from the descriptive statistics, since these values are important for the econometric analysis. Base year: 2006.

Independent variables	Coefficient estimates	R^2
ΔLLP	-.0896***	
	(-2.98)	
IFRS	.1787**	4.77%
	(2.32)	
ΔLLP*IFRS	-.1603*	
	(-1.73)	

7.2.3. Robustness check

The findings associated with the sign of the slope coefficient naturally raise the question if the results are robust. For checking the robustness of the econometric model used for testing of *H2a* and *H2b*, the model in the study of Zhang et al. (2009) is applied[39]. The regression in the current study is:

$$BCS_{i,t} = \beta_0 + \beta_1 LLP_{i,t-1} + u_{i,t}$$

Where:

BCS represents the annualized bond credit spreads based on the date of the 4Q accounting information disclosure.
LLP represents the reported loan loss provisions/total assets[40] of the previous year for all banks (both IFRS and US GAAP banks).
u represents the error term.

The empirical results are consistent with those derived from the initial model. More precisely, the coefficient estimate on *LLP* is -.0826 and it is significant at the 1% significance level (t-statistics: -3.44).

7.3.1. Descriptive statistics for the dataset of banks with CDS

Table VI presents the aggregate and year-by-year descriptive statistics for the sub-sample of banks with CDS contracts. Collectively, the variable *ΔCDS* has mean .105, median -

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[39] Although the model of Zhang et al. (2009) is used for explaining the CDS spreads, the fact that bond credit spreads and CDS spreads are strongly related, makes the use of this model appropriate. Moreover, Zhang et al. (2009) use the model from Collin-Dufrense et al. (2001) to check the robustness of their model.
[40] Following the literature, LLP is deflated by Total Assets in order the amounts in the F.E. regression to be comparable.

.00009 and standard deviation 7.080. Regarding *ΔLLP*, its mean, median, and standard deviation are .314, .073, and 2.798 respectively. Moreover, the mean value of *IFRS* is .896 while its standard deviation is .306. Finally, the correlation between *ΔCDS* and *ΔLLP* is -0.134, and between *ΔCDS* and *IFRS* is -0.0008. The correlation between *ΔBCS* and *ΔLLP* is graphically illustrated in Graph III.

The year-by-year statistics display similar characteristics with those of the banks with listed bonds. More precisely, the mean of *ΔCDS* is increased significantly between 2006 and 2007, and subsequently its value drops sharply from 9.932 in 2007 to -7.06 in 2008. As in the case of bond markets, the results indicate that the increased default probability caused by the financial crisis was anticipated by CDS markets as well. In addition, the sharp decrease in *ΔCDS* between 2007 and 2008 could be justified by state involvement for stabilizing the banking sector. Furthermore, in 2008 the variable *ΔCDS* demonstrates its lower mean value (-7.06). At the same time, during that year the *ΔLLP* variable has its second highest value (1.777).
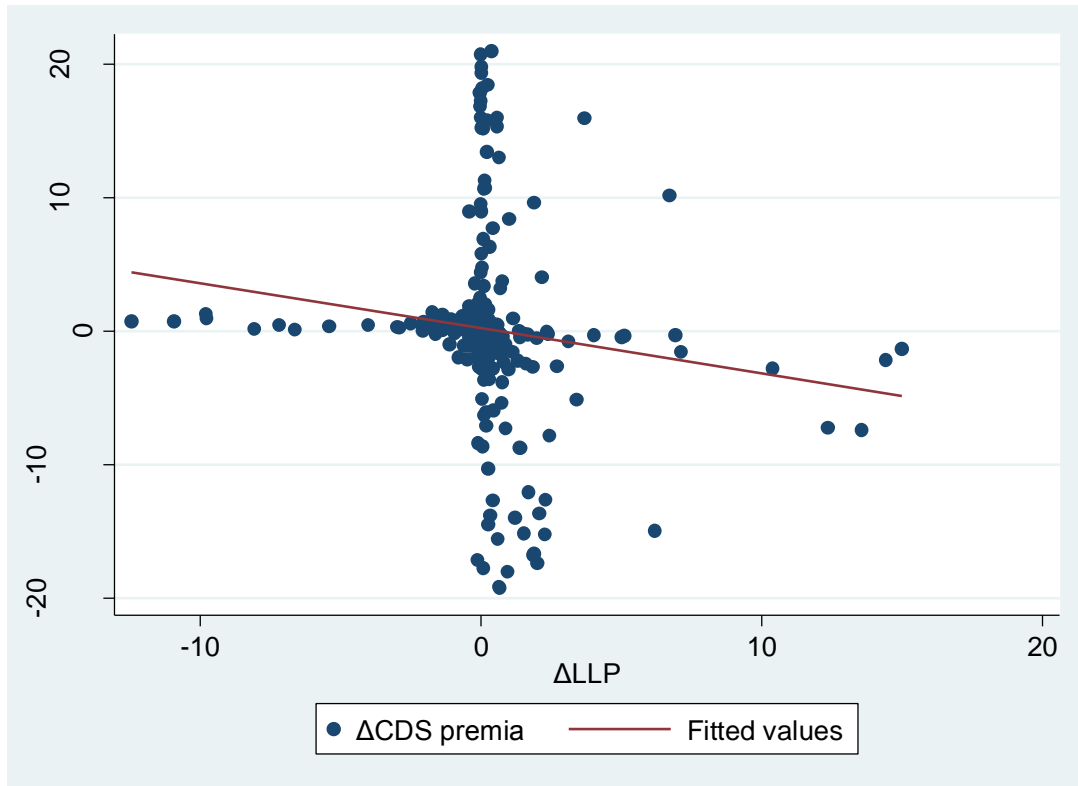
Table VI

Note: Descriptive statistics for the sub-sample of 48 banks with CDS over 2005-2011 that (1) have LLP data available on Bankscope and (2) have CDS premia data available on Datastream. In addition, the 1% upper and down values of ΔCDS are dropped in order to have more representative descriptive statistics. In Appendix 5 are presented the descriptive statistics including the dropped 1% upper and down values of ΔCDS.

Aggregate summary statistics									
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ΔCDS	254	.105	7.080	-19.295	-1.41	-.00009	.978	20.944	1.000
ΔLLP	259	.314	2.798	-12.434	-.149	.073	.615	15.005	-0.134
IFRS	288	.896	.306	0	—	—	—	1	-0.0008

Year-by-year summary statistics									
2006									
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ΔCDS	32	-.198	.653	-2.471	-.377	-.092	.023	1.386	1.000
ΔLLP	32	.101	.453	-1.605	-.015	.019	.251	1.415	-0.054
IFRS	48	.896	.309	0	—	—	—	1	0.05
2007									
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ΔCDS	41	9.932	6.616	-1.410	4.377	9.471	15.92	20.729	1.000
ΔLLP	43	.447	1.209	-.399	.009	.047	.259	6.72	0.055
IFRS	48	.896	.309	0	—	—	—	1	0.0009
2008									
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ΔCDS	42	-7.06	9.607	-19.29	-14.95	-7.637	-2.79	20.943	1.000
ΔLLP	44	1.777	3.106	-.104	.218	.643	1.798	13.579	-0.103
IFRS	48	.896	.309	0	—	—	—	1	0.028

Table VI
Continued

| | | | | **2009** | | | | | |
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ΔCDS	47	-2.47	3.559	-15.60	-2.661	-1.441	-.344	.221	1.000
ΔLLP	48	1.823	3.213	-.789	.237	.768	2.042	15.006	0.097
IFRS	48	.896	.309	0	—	—	—	1	-0.065

| | | | | **2010** | | | | | |
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ΔCDS	46	.846	1.066	-2.698	.402	.709	1.25	3.682	1.000
ΔLLP	46	-1.58	2.757	-12.435	-1.68	-.657	-.095	1.157	0.148
IFRS	48	.896	.309	0	—	—	—	1	0.037

| | | | | **2011** | | | | | |
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ΔCDS	46	-.008	.968	-3.496	-.474	.123	.644	1.298	1.000
ΔLLP	46	-.749	2.531	-10.916	-.706	-.163	.073	5.017	-0.276
IFRS	48	.896	.309	0	—	—	—	1	-0.125

Graph III

7.3.2. Empirical results

Table VII includes the empirical results from the regression in section 6.2.3., which is applied for testing *H3a* and *H3b*. The coefficient estimate on *ΔLLP* is -.4224 and it is

significant at the 1%. These results are identical to those from the regression for testing the *H2a*, stipulating LLP as an important variable in explaining the variation in CDS premia. Furthermore, the unexpected negative sign on the coefficient denotes that in the process of evaluating the credit quality of banks, CDS markets consider various micro- and macro-economic factors. The coefficient on *IFRS*, which is estimated through a random-effects regression, is insignificant at all conventional levels indicating that there is no significant difference in CDS premia between banks applying IFRS and banks applying US GAAP. The Hausman test renders the use of a R.E. regression instead of a F.E. regression for estimating the dummy *IFRS* appropriate (see Appendix 6). Moreover, the coefficient estimate on *ΔLLP*IFRS* is -.6396 and it is significant at the 10% significance level. Similar to bond credit spreads, this result indicates a rather unsubstantial difference in the accounting quality (i.e. relevance) between IFRS and US GAAP.

As in the case of bond credit spreads, when the time fixed-effects is applied in the regression, the coefficient on *ΔLLP* becomes insignificant at all conventional levels. The conclusion is that time varying factors are important variables in explaining the variation on CDS premia. Following the same reasoning which was applied in section 7.2.2., the dummy variables *Good Times* and *Bad Times* are included as control variables in the F.E. regression. The coefficient on *Good Times* (*Bad Times*) is positive (negative) and it is significant at the 1% significance level, while the coefficient on *ΔLLP* becomes significant at the 1% (t-statistics: -3.52). Moreover, the inclusion of the variable *Good Times* increases the explanatory power of the model significantly. R^2 is increased from 3.92% to 27.74%. Arguably, there is a significant difference in CDS premia trend before and after the financial crisis. Following the reasoning in section 7.2.2, the interaction term *ΔLLP*Good Times* is included in the F.E. model. The coefficient estimate on *ΔLLP*Good Times* is positive (1.6435) and significant at the 1% level (t-statistics: 2.82). Similar to bond credit spreads, the positive sign on the coefficient denotes that the correlation between CDS premia and bank LLP before the crisis was positive. The significance of the coefficient on *ΔLLP*Good Times*, though, contradicts the findings regarding the same variable in bond credit spreads tests. Evidently, the significance of LLP in explaining the variation in CDS premia differs between the years prior to and after the outbreak of the financial crisis. This finding stipulates that the crisis has influenced the explanatory significance of bank LLP on CDS premia. Nevertheless, it is unclear whether the explanatory power of LLP is increased due to the crisis or not. The positive sign on *Good Times* in combination with the negative sign on *Bad Times* indicate that the unexpected negative correlation between CDS premia and bank LLP is driven by the financial crisis. The extent, though, to which the financial crisis is responsible for the negative sign on *ΔLLP,* cannot be determined from these two variables.

Table VII

Note: Empirical results regarding the main variables of the regression for testing H3a and H3b. *T*-statistics are shown in parentheses. (***) Indicates significance at the 1% level and (*) indicates significance at 10% level. The coefficient on IFRS is estimated by using a random-effects regression. The coefficient estimates on ΔLLP and on ΔLLP*IFRS are estimated through a fixed-effects regression. From the regressions are not dropped the 1% upper and down values of ΔCDS which were excluded from the descriptive statistics, since these values are important for the econometric analysis. Base year: 2006.

Independent variables	Coefficient estimates	R^2
ΔLLP	-.4224***	
	(-6.75)	
IFRS	-.1474	27.74%
	(-1.01)	
ΔLLP*IFRS	-.6396*	
	(-1.86)	

7.3.3. Robustness check

The unexpected sign of the coefficient estimate on the main independent variable of interest (*ΔLLP*) has reasonably raised the issue of whether or not the results are robust. Therefore, the model from the study of Zhang et al. (2009) for expalining the CDS spreads is applied to control the robustness of the results. The regression in the current study is:

$$CDS\ Premia_{i,t} = \beta_0 + \beta_1 LLP_{i,t-1} + u_{i,t}$$

Where:

CDS Premia represents the annualized CDS premia based on the date of the 4Q accounting information disclosure.
LLP represents the reported loan loss provisions/total assets of the previous year for all banks (both IFRS and US GAAP banks).
u represents the error term.

The empirical results confirm the findings from the initial model. The coefficient estimate on *LLP* is -.3528 and it is significant at the 1% significance level (t-statistics: -3.34).

7.4. Empirical results regarding H4

Table VIII presents the empirical findings from the three separate regressions used for testing *H4*. As can be seen in the table, the coefficient estimate on *ΔLLP* is significant at the 1% significance level in all the regressions. The *t-statistics* relative to regressions 1, 2, and 3 are 4.29, -3.13, and -3.27 respectively. The results regarding regressions 2 and 3 are identical to those in sections 7.2.2 and 7.3.2 since they derived from the same model. Furthermore, it is interesting to note that the results concerning regression 1 contradict

those in section 7.1.2. Although in both modeling specifications the coefficient estimate on $ΔLLP$ is significant at the 1%, the sign on the coefficient is different (negative in section 7.1.2 and positive in section 7.4). The different model specification could be an explanation for the inconsistency in the coefficient's sign[41]. In an effort to deepen the analysis, the dummy variable *Good Times* is included as a control. The inclusion of the control variable did not cause any change in the significance or in the sign of the coefficient on $ΔLLP$. Interesting, though, is that in regression 1, *Good Times* is significant at the 1% level (coefficient: -.0783 and t-statistics: -5.33). This result contradicts the findings in section 7.1.2, where the same dummy variable was insignificant at all conventional levels[42].

Very interesting information is also conveyed through the R^2. The estimated R^2 is 4.03% in regression 1, 4.77% in regression 2, and 27.74% in regression 3. These results indicate that $ΔLLP$ has significantly greater explanatory power over the variation in CDS premia relative to abnormal stock returns and bond credit spreads. Furthermore, $ΔLLP$ explains relatively more variation in bond credit spreads compared to abnormal stock returns. This finding is reasonable since CDS premia and bond credit spreads are strongly related to each other. Although R^2 does not provide any indication regarding the quality of the model, it has been used in prior research as a reflection of independent variables' predictability and value relevance (see Barth et al. (2012) and Van der Meulen et al. (2007)). In this respect, the findings associated with the R^2 denote that bank LLP is more relevant for predicting the variation in CDS premia compared to stock returns and bond credit spreads. This finding is in line with *H4*.

Table VIII

Note: Empirical results regarding the main variables of the regressions for testing H4. *T*-statistics are shown in parentheses. (***) Indicates significance at the 1% level. All coefficients are estimated by applying a fixed-effects regression. No observations are excluded from the three regressions. Base year: 2006.

Regressions	Dependent variable	Independent variable	Coefficient estimates	R^2
1	ΔASR	ΔLLP	.0712*** (4.29)	4.03%
2	ΔBCS	ΔLLP	-.0913*** (-3.13)	4.77%
3	ΔCDS premia	ΔLLP	-.4224*** (-3.27)	27.74%

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[41] Unfortunately, due to the limited time for completing a master thesis (20 weeks) it was not possible to further investigate the inconsistency in the coefficient's sign. This could be done in future research.
[42] The limited time for completing the master thesis rendered it difficult to further investigate the inconsistency in *Good Times* as well.

8. Discussion

What conclusions can be drawn by the regression analysis? On the aggregate level, the empirical results indicate that bank LLP is a significant variable in explaining the variation in equity, bond, and CDS markets. What can be derived from these findings is that bank LLP is indeed a factor that is considered by the three financial markets when assessing the credit quality of banks. Although equity, bond, and CDS markets capture different economic aspects, implying variation in their decision making needs, they all use bank reported LLP to facilitate and enhance their decision making processes. Interesting, though, is that the effect of bank LLP on bond credit spreads and CDS premia contradicts the anticipated one. The negative sign on the coefficient estimate on LLP indicates that these two markets consider various micro- and macroeconomic factors when evaluating banks' credit quality. The negative effect of LLP on stock returns, on the other hand, is consistent with existing literature denoting that equity markets perceive bank LLP more as a sign of wider underlying problems rather than as a signal of future strength.

Consistent with findings in prior research, the empirical results indicate a deviation in the accounting quality between IFRS and US GAAP frameworks. The significance of the difference, however, varies between the three markets. As indicated by the regression results, the difference in the relevance between the two sets of standards is extremely significant (1% level) in equity markets and marginally significant (10% level) in bond and CDS markets. Important to note is that the statistical tests which were conducted in this study do not provide any indication regarding which of the two accounting frameworks demonstrate higher accounting quality[43]. Equally, no evidence concerning the causes of the discrepancy in the accounting relevance between IFRS banks and US banks under US GAAP is delivered. More precisely, it is hard to claim whether the deviation is caused by differences in the frameworks themselves or by variations in the enforcement, regulation, and litigation environment in which the two groups of banks operate. Even though the similar accounting handling of credit loss recognition under IFRS and US GAAP could be perceived as an indication that the contextual differences are responsible for the discrepancy in relevance, a more thorough investigation is required in order to shed light on that issue.

The regression analysis has also revealed links between the negative effect of LLP on bond and CDS markets, and the financial crisis. Even though bank default probability was increased due to the crisis, both markets demonstrate an unexpected decreasing trend after the outbreak of the crisis. A potential explanation to this unforeseen behavior could be the involvement of the E.U. and the U.S. government for stabilizing the banking

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[43] Empirical findings in prior research indicate that US GAAP produce accounting figures of better quality in terms of predictability and value relevance than IFRS do [see Barth et al. (2012), Leuz (2003) and Van der Meulen et al. (2007)].

industry. In addition, a deviation in the significance of bank LLP in explaining the variation in CDS premia prior to and after the outburst of the financial crisis is apparent. This finding denotes that in contrast to bond credit spreads, the explanatory significance of LLP on CDS premia is affected by the crisis. Since CDS markets are exclusively interested in the default risk of firms and the main implication of the crisis was the increased default probability, this result is not surprising. It is hard, though, to say whether the explanatory power of LLP on CDS premia is influenced positively by the crisis or not. It can be only assumed, by implication, that after the eruption of the crisis the significance of LLP in explaining the variance in CDS premia was increased. Besides the influence of the financial crisis on bond and CDS markets, the econometric analysis revealed an overall high bond credit spreads and CDS premia sensitivity to time-varying factors. Concerning the correlation between bank LLP and equity markets the empirical results provide indications that time-varying variables in general and the financial crisis in particular had no significant effect on it. The roots of the inconsistency in the effect of the crisis on equity, bond, and CDS markets can be traced on the different economic aspects the three markets capture. In this respect, it is reasonable that the crisis had a significant effect on bond and CDS markets since these two markets are primarily focused on the default probability of firms. Important to note, however, is that when the same model for testing the bond credit spreads and CDS premia hypotheses was applied to the equity hypothesis, a significant effect of the crisis on stock returns was revealed. The difference in the equity market findings could be caused by the different models which were used.

As revealed by the regression analysis, the empirical findings associated with the sign and the significance of the coefficient on *ΔLLP* in bond and CDS tests are identical. This finding can be justified by the strong interactions between these two markets, as well as by the fact that both markets capture common economic aspects. Besides the difference in the *ΔLLP*Good Times* variable, a discrepancy in the results regarding the coefficient on the *IFRS* variable between bond credit spreads and CDS premia is present. Although the regression output concerning the bond markets indicates a significant difference in the credit spreads between IFRS and US GAAP banks, such difference is absent in the CDS premia results. This discrepancy in the significance of the *IFRS* variable may be driven by the fact that the CDS sample is strongly unbalanced with regard to the accounting sets of standards[44]. As in the case of bond credit spreads, a significant difference in the abnormal stock returns between banks applying IFRS and banks applying US GAAP is apparent in equity markets as well. In both cases, the IFRS banks demonstrate slightly higher credit spreads and abnormal stock returns.

Another interesting finding of the present study is associated with the relevance of bank LLP relative to the three financial markets. As expected from *H4*, bank LLP demonstrate

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[44] From the total number of 48 banks with CDS, only 5 apply US GAAP.

higher relevance with respect to the decision making needs of CDS markets compared to equity and bond markets. This finding is totally reasonable and it is justified by the messages conveyed through bank LLP and by the specific characteristics of the CDS markets as well. Arguably, the main message conveyed through bank LLP is related to the probability of default. As discussed in previous sections, credit losses have been acknowledged as major drivers of bank failure. At the same time, CDS market is exclusively concerned with the default probability of reference entities. Therefore, the higher relevance that bank LLP exhibit with regard to the decision making needs of CDS market is totally justifiable.

The descriptive statistics associated with the samples of banks with listed bonds and CDS contracts provide some stimulating outcomes as well. As can be seen in tables IV and VI, both markets exhibit a sharp increase in 2007. In combination with the fact that the crisis started in the late 2007 and expanded during 2008, this statistical result could be an indication that bond and CDS markets had anticipated the financial crisis. This inference is further supported by the regression output which indicates that both markets demonstrated a positive trend during 2006 and 2007. Conversely, the descriptive statistics regarding the abnormal stock returns show that the reaction of stock markets came after the expansion of the crisis in 2008. Yet, these findings can be perceived only as raw indications and further analysis is required in order to shed light on the issue of whether and to what extent bond and CDS markets had indeed anticipated the crisis.

9. Concluding remarks

The objective of this study was to evaluate the quality of bank accounting information. Specifically, by using archival data from equity, bond, and CDS markets and correlating them with bank reported loan loss provisions; this paper scrutinizes the relevance of bank financial figures. Overall, the empirical findings indicate that bank accounting data is relevant to the decision making needs of these three financial markets. Interesting, though, is that the effect of LLP on bond credit spreads and CDS premia contradicts the expectations. The main inference drawn by this finding is that both markets consider several firm-specific and economy-wide factors when assessing the credit quality of banks. There are also indications that this unanticipated finding is associated with the financial crisis. As denoted by the empirical results the effect of the crisis is greater on the CDS markets compared to bond markets. No such effect on equity markets is traced. Furthermore, as forecasted the relevance of bank reported LLP is higher with respect to the decision making needs of CDS markets compared to the other two. The main contribution of these results is related to the discussion concerning the accounting quality, particularly within the banking industry.

Moreover, a comparison of the accounting quality between banks applying IFRS and US banks applying US GAAP is made. The regression analysis revealed a significant

deviation in terms of relevance between the two accounting frameworks. The question, though, which of the two sets of standards dominates with regard to quality remains unanswered. Moreover, the causes of the discrepancy in the relevance remain unidentified as well. In this respect, it is hard to claim either that this difference is caused by the standards themselves or by variances in the enforcement, regulation, and litigation environment the two groups of banks face. These findings add useful insights to the discussion concerning the accounting quality under IFRS and US GAAP. More interesting, though, these results provide raw indications that contextual differences between the two groups of banks could have greater explanatory power on the inconsistency in the relevance than the accounting standards do. An additional difference between the two sets of standards is apparent on the level of the abnormal stock returns and bond credit spreads. As stipulated by the econometric results, IFRS banks demonstrate relatively higher abnormal stock returns and bond credit spreads.

Collectively, the empirical results denote that bank accounting data has superior predictive ability on the variation in stock prices, bond credit spreads, and CDS premia. Bank LLP is indeed a piece of accounting information that influences the investment decisions of the actors within the three examined markets. Driven by the fact that these three markets are major users of bank financial data, it can be argued that the accounting quality in the banking sector with respect to relevance is high.

The empirical findings of the present study set the groundwork for future research in several routes. It will be interesting, for instance, to scrutinize the sensitivity that the bond credit spreads and the CDS premia exhibit to time-varying variables. An analysis on that level will enhance our understanding regarding the economic forces that exercise influence on these two financial markets. Likewise, the investigation of the unexpected negative effect of LLP on bond and CDS markets will shed light on the same issue. Furthermore, by focusing on the issue of whether or not bond and CDS markets had anticipated the financial crisis the researchers and the market analysts will be in position to develop stronger forecasting mechanisms. Moreover, the examination of the discrepancy in the relevance between banks following IFRS and US banks applying US GAAP could be very informative. Such research will not only allow the regulators and the academic community to augment their understanding regarding which of the two frameworks produces accounting data of better quality, but also it will unveil the potential causes of the difference. Regarding the later, future studies will most likely explain whether the deviation in relevance is caused by the actual standards or by contextual differences. The statistically significant deviation in the abnormal stock returns and bond credit spreads between IFRS and US GAAP banks is another finding that could stimulate future research. In this respect, any effort to explain this difference between the two accounting frameworks will illuminate the driving factors of this deviation. Such insights could be very useful for both researchers and market

participants. In addition, there are some findings indicating that stock return tests might be sensitive to the model specification. Hence, by scrutinizing this issue the researchers will be able to construct more robust models for testing the correlations between accounting data and stock returns. Finally, the substantial differences between the three studied markets with respect to the economic aspects they capture and the diverse decision making needs they have, act as stimulus to deepen the research in banks further and extend it to other industries as well. In this respect, future research projects will enhance the existing knowledge associated with the usefulness of the accounting information relative to users' varying demands.

10.   Study limitations

The research concentration in banks restricts the generalization of the findings within the boundaries of the banking industry. Moreover, the investigation of the other three qualitative characteristics of accounting information (i.e. comparability, reliability, and understandability) is out of the scope of this study. With regard to the study sample, the use of Datastream as the only source of equity, bond, and CDS data restricts the sample of the banks. Therefore, the use of additional databases in the future will result in a bigger bank sample, enhancing the reliability of the empirical results. Finally, although the variables in the econometric models are adequate for the purpose of the present thesis, the inclusion of more control variables would have enhanced the robustness of the empirical findings.

Appendices

Appendix 1

The table presents the descriptive statistics for the dataset of listed banks with the 1% upper outliers included. As can be seen, when the 1% upper outliers included, the max value of ASR is increased from 1.381 to 2.712. The outliers are also illustrated graphically in the graph below the table.

Aggregate summary statistics								
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ASR	1059	-.035	.371	-.967	-.213	-.081	.068	2.712	1.000
ΔLLP	1182	.107	1.379	-12.435	-.009	.0042	.055	15.006	-0.159
IFRS	1206	.567	.497	0	—	—	—	1	0.120
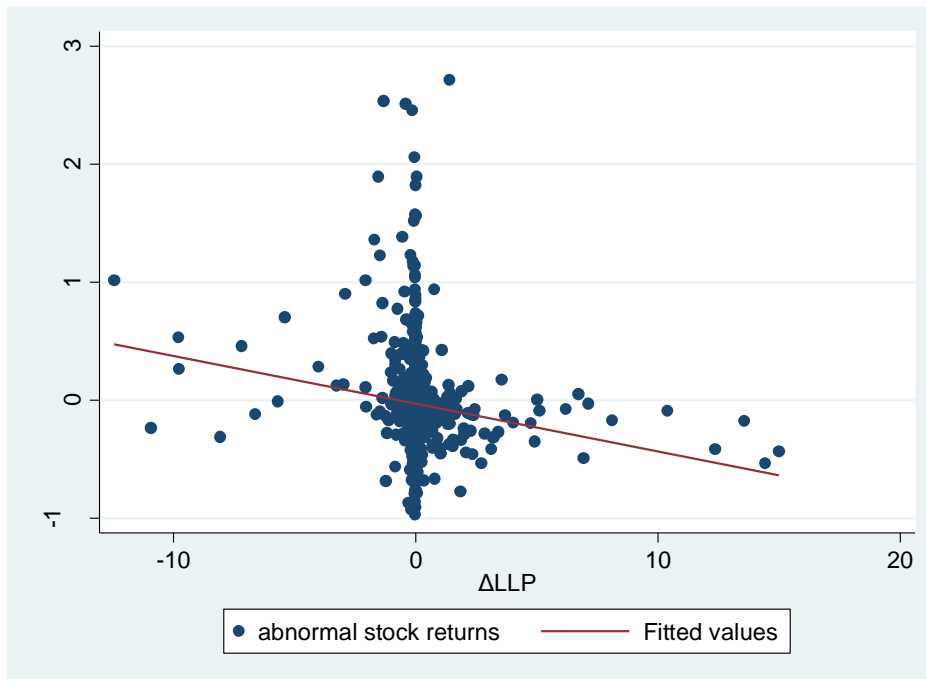
Appendix 2

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. hausman fixed random

                      ──── Coefficients ────
                    (b)            (B)           (b-B)       sqrt(diag(V_b-V_B))
                   fixed          random       Difference           S.E.
      ─────────────────────────────────────────────────────────────────────────
       LLP      -.0447043      -.0404062       -.0042981          .0014962
      ─────────────────────────────────────────────────────────────────────────

                        b = consistent under Ho and Ha; obtained from xtreg
           B = inconsistent under Ha, efficient under Ho; obtained from xtreg

     Test:  Ho:  difference in coefficients not systematic

              chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =         8.25
            Prob>chi2 =      0.0041
```

From the Hausman test above we can see that there is significant difference between the coefficient estimates produced under the two alternative regressions (P-value=0.0041). Hence, the use of a random-effects regression instead of a fixed-effects regression is inappropriate for testing *H1* and by implication for estimating and interpreting the coefficient on *IFRS*.

Appendix 3

The table presents the descriptive statistics for the dataset of banks with listed bonds. In this table the 1% upper and down outliers are included. As can be seen, when the 1% upper and down outliers are included, the min and the max values of ΔBCS are increased significantly. More precisely, the min value is increased from -5.105 to -24.518 and the max value from 5.452 to 25.573. The outliers are also illustrated graphically in the graph below the table.

Aggregate summary statistics									
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ΔBCS	364	.076	3.049	-24.518	-.735	.125	.727	25.573	1.000
ΔLLP	411	.176	2.132	-12.434	-.067	.017	.274	14.44	-0.062
IFRS	426	.620	.486	0	—	—	—	1	0.027
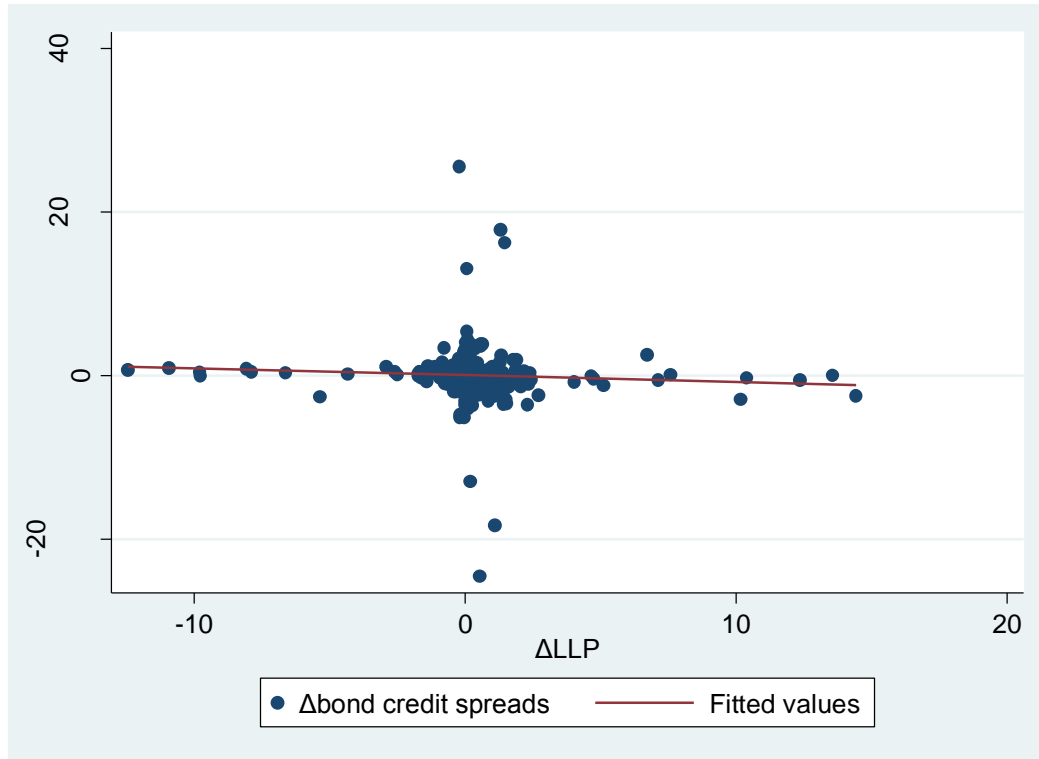
Appendix 4

```
. hausman fixed random

                 ——— Coefficients ———
                  (b)            (B)            (b-B)       sqrt(diag(V_b-V_B))
                 fixed         random        Difference           S.E.

         LLP    -.0896212     -.0833803       -.0062409          .0350914

                        b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                 chi2(1)  = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =         0.03
                 Prob>chi2 =      0.8588
```

From the Hausman test above we can see that there is no significant difference between the coefficient estimates produced under the two alternative regressions (P-value=0.8588). Hence, the use of a random-effects regression instead of a fixed-effects regression is appropriate for testing *H2* and by implication for estimating and interpreting the coefficient on *IFRS*.

Appendix 5

The table presents the descriptive statistics for the dataset of banks with listed bonds. In this table the 1% upper and down outliers are included. As can be seen, when the 1% upper and down outliers are included, the min and the max values of ΔCDS are increased. More precisely, the min value is increased from -19.295 to -26.892 and the max value from 20.944 to 27.246. The outliers are also illustrated graphically in the graph below the table.

				Aggregate summary statistics					
Variable	Obs.	Mean	S.D.	Min	25%	Median	75%	Max	Correlation
ΔCDS	259	.022	7.887	-26.892	-.735	.125	.727	27.246	1.000
ΔLLP	259	.314	2.798	-12.434	-.149	.073	.615	15.005	-0.134
IFRS	288	.896	.306	0	—	—	—	1	-0.0008
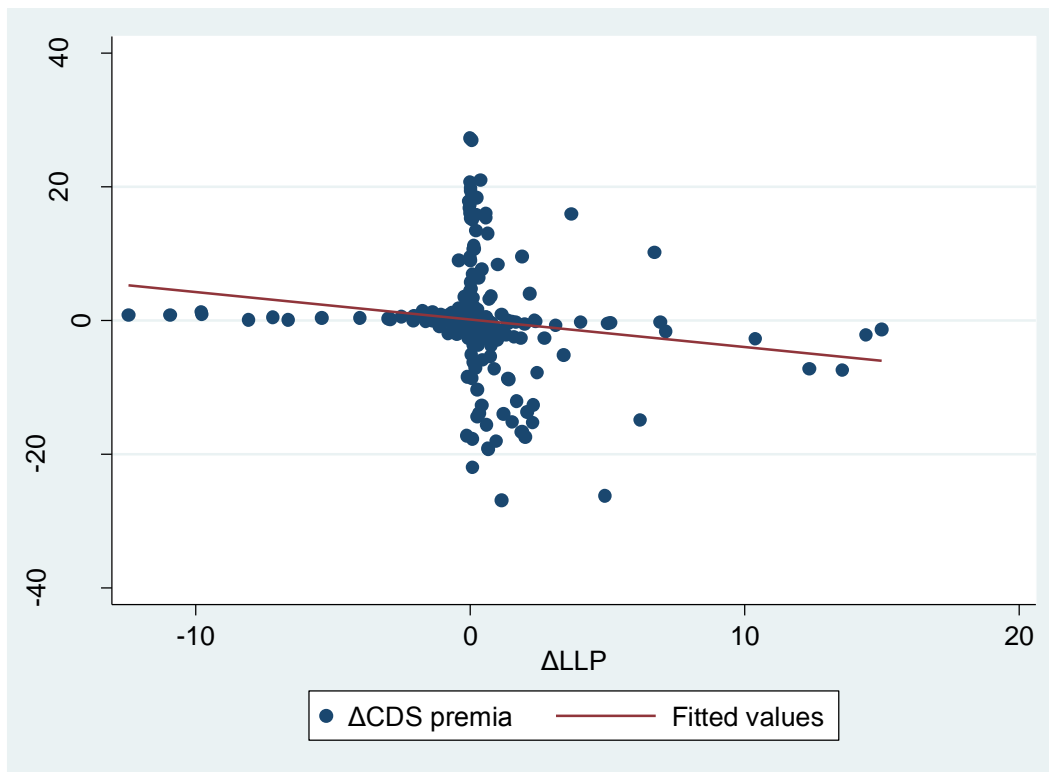
Appendix 6

```
. hausman fixed random

                   ──── Coefficients ────
                   (b)           (B)            (b-B)        sqrt(diag(V_b-V_B))
                  fixed        random        Difference            S.E.
       ──────────────────────────────────────────────────────────────────────────
          LLP    -.4224648    -.4095784       -.0128864           .0858179
       ──────────────────────────────────────────────────────────────────────────

                          b = consistent under Ho and Ha; obtained from xtreg
           B = inconsistent under Ha, efficient under Ho; obtained from xtreg

       Test:  Ho:  difference in coefficients not systematic

              chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =          0.02
            Prob>chi2 =        0.8806
```

From the Hausman test above we can see that there is no significant difference between the coefficient estimates produced under the two alternative regressions (P-value=0.8806). Hence, the use of a random-effects regression instead of a fixed-effects regression is appropriate for testing *H3* and by implication for estimating and interpreting the coefficient on *IFRS*.

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