



UNIVERSITY OF ESSEX

Value Relevance of IFRS and the Effect of the Financial Crisis:
Evidence from European financial firms

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Declaration

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text

Abstract

This thesis investigates the value relevance of International Financial Reporting Standards (IFRS) and the effect of the financial crisis on European financial firms. The empirical work is divided into two parts. The first part examines the impact of mandatory IFRS adoption and of the financial crisis on the value relevance of accounting information. For a sample of financial firms listed in the European Economic Area (EEA) and Switzerland over 1998-2012, the results indicate that the combined value relevance of book value of equity and earnings has increased following mandatory IFRS adoption in 2005, thereby supporting the view that IFRS adoption improves the quality of accounting information. In addition, the findings suggest that the value relevance of book value of equity increases while that of earnings decreases as the financial crisis evolves. Moreover, during the crisis period the value relevance of equity book value appears greater for firms operating in countries with weak institutional environment as well as for firms with weak corporate governance mechanisms. The results are consistent for the whole sample of financial firms and a sub-sample of banks.

The second empirical part of this thesis evaluates the value relevance of fair value hierarchy under IFRS 7 that requires firms to classify fair value measurements into three levels based on the valuation inputs. Using a sample of listed financial firms in the EEA and Switzerland over 2009-2012, the results show that the value relevance of level 1 and level 2 fair values is greater than the value relevance of fair values at level 3, although the difference is significant only for level 1. Furthermore, the evidence suggests that the value relevance of level 3 fair values is lower for firms domiciled in countries characterised by a weak institutional environment and for firms with weak corporate governance mechanisms.

Keywords: IFRS, Value Relevance, Financial Crisis, IFRS 7, Fair Value.

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Abbreviations

AR:	Autoregressive Process
DDM:	Dividend Discount Model
EEA:	European Economic Area
EU:	European Union
FASB:	(US) Financial Accounting Standards Board
GAAP:	Generally Accepted Accounting Principles
GDP:	Gross Domestic Product
IAS:	International Accounting Standards
IASB:	International Accounting Standards Board
IASC:	International Accounting Standards Committee
IFRS:	International Financial Reporting Standards
LLPs:	Loan Loss Provisions
OLS:	Ordinary Least Squares
S&P 500 index:	Standard and Poor 500 Index
SFAS:	Statement of Financial Accounting Standards
UK:	United Kingdom
US:	United States
WEF:	World Economic Forum

Chapter 1: Introduction

1.1 Background

Over the last few decades and under the globalisation of markets and politics, there has been a growing interest in harmonising accounting standards worldwide. To satisfy the information needs of international investors in the rapidly expanding globalised financial markets, the International Accounting Standards Committee (IASC) was established in 1973, with the aim of introducing a set of harmonised financial reporting standards across national borders, named International Accounting Standards (IAS). In 2001, IASC was restructured to form the International Accounting Standards Board (IASB). IASB has the responsibility of issuing largely principle-based accounting standards called the International Financial Reporting Standards (IFRS) after adopting the existing accounting standards, IAS. The main objective of IASB is to develop a single set of high quality, understandable, enforceable and globally accepted international financial reporting standards (IASB, 2013). Since IASB was formed, the adoption of IFRS has gained considerable momentum in many countries around the world. By the end of 2014, over 120 countries and financial reporting jurisdictions were required or permitted the use of IFRS to prepare the financial statements of listed firms (Pacter, 2015).

The impact of IFRS adoption on accounting information quality has been extensively studied in the accounting literature. One of the attributes used in the literature to measure the quality of financial statement information is value relevance. Value relevance is defined as the ability of accounting information to capture or summarise information that affects the market value of equity (Francis and Schipper, 1999). Previous studies investigating the effect of mandatory IFRS adoption on the value relevance of accounting information have produced inconclusive results. Some of these studies report an increase in the value relevance of accounting information (e.g. Devalle et al., 2010; Filip, 2010; Clarkson et al., 2011; Liu et al., 2011), whereas others show empirical findings suggesting no significant change or even a

decrease in the value relevance of accounting information following IFRS adoption (Gjerde et al., 2008; Morais and Curto, 2008; Dobija and Klimczak, 2010; Chalmers et al., 2011; Karampinis and Hevas, 2011; Tsalavoutas et al., 2012). The majority of these studies use samples of firms from a wide spectrum of industries. Hence, there is a need for research to evaluate the impact of IFRS adoption on the accounting information quality of a single industry, because each industry has specific characteristics that are likely to affect the value relevance of accounting information (Barth et al., 1998a; Anandarajan et al., 2011). Additionally, due to their distinct characteristics, a large stream of previous research excludes financial firms from their samples when evaluating the impact of IFRS adoption on the value relevance of accounting information (e.g. Oliveira et al., 2010; Liu et al., 2011; Tsalavoutas et al., 2012).

Under IFRS, financial statements are required to be issued including both the balance sheet and the income statement.¹ These two statements fulfil different roles or at least they provide incremental information relative to each other (Watts, 1974; Holthausen and Watts, 2001). For valuation purposes, the balance sheet provides information to facilitate loan decisions and the monitoring of debt contracts (Barth et al., 1998a); as such, it provides information on the liquidation value of the firm (i.e. what is available to firm's debtholders in case of default). The income statement, on the other hand, provides information on abnormal earnings opportunities (i.e. unrecognised net assets) used mainly for equity valuation. Since the probability of default increases during a financial crisis, investors are likely to place more importance on liquidation value information presented by the balance sheet for valuation purposes. In contrast, less emphasis would be placed on future growth opportunities reflected in the income statement. This is particularly important for financial firms publishing their financial statement in accordance

¹ Under IAS1 *Presentation of Financial Statements*, four financial statements are required to be prepared by the reporting entity: a statement of financial position (the balance sheet), a statement of profit and loss and other comprehensive income (the income statement), a statement of changes in equity, and a statement of cash flows (IASB, 2014a).

with IFRS, given that in periods of crisis fair value (market-based) measures reflect the liquidation values more than future payoffs (Allen and Carletti, 2008). In this context IFRS require many financial instruments, widely held by financial firms, to be recognised at fair value in the balance sheet prioritising the market prices over other inputs used to measure fair values.

IASB has developed several accounting standards to expand the use of fair value measurements and enhance the disclosure about fair value amounts, such as IAS 39 and IFRS 7. Effective for the fiscal years beginning on or after 1 January 2009, IASB issued amendments to IFRS 7 requiring financial instruments recognised at fair value to be disclosed by levels based on valuation inputs. Level 1 fair values are those measured on the basis of quoted prices in active markets. Level 2 fair values are those determined by indirectly observable inputs, other than those included in level 1 (using, for instance, quoted market prices of comparable or related instruments). Finally, level 3 fair values are those that are estimated using unobservable inputs (i.e. internally generated inputs). The usefulness of fair value information to investors is still debated in the financial accounting literature. Advocates of fair value accounting argue that fair values imply more value relevant accounting information to investors and represent more accurately real volatility (e.g. Laux and Leuz, 2009; Badertscher et al., 2012). This argument is based on the premise that market-based fair value reflects the investors' consensus on the expected future cash flows of an asset or liability (Barth and Landsman, 1995; Hitz, 2007). This is unassailable when all fair values are measured based on quoted prices of identical assets and liabilities traded in complete and perfect markets. At the other extreme, opponents of fair value-based accounting have questioned the reliability of fair value measurements, especially with the absence of active markets for the assets and liabilities under measurement, or when markets are illiquid (Nelson, 1996; Landsman, 2007; Penman, 2007). In such cases, fair value measurements are less verifiable by investors and more subject to managerial bias and measurement errors, resulting in information asymmetries between investors and managers. The greater the

information asymmetry associated with unobservable inputs of fair value, the less reliable and the less value relevant the fair value information.

In general, the quality of accounting information, especially when there is room for managerial discretion, is explained by firms' incentives (Ball et al., 2000; Ball et al., 2003; Leuz, 2003; Burgstahler et al., 2006; Laux and Leuz, 2009). That is, the way firms use such discretion depends to a great extent on their incentives, which in turn are determined by many factors, including the institutional environment characteristics and corporate governance mechanisms. It is reasonable, therefore, to expect that the strength of institutional environment and corporate governance mechanisms have an impact on the value relevance of accounting information. Moreover, given the managerial discretion inherent in fair values with unobservable inputs, institutional settings and corporate governance factors are expected to play a key role in mitigating the information asymmetry problems associated with fair value estimates.

This chapter is organised as follows: Section 1.2 describes the research aim and objectives. Section 1.3 presents the research questions; Section 1.4 shows the motivations for focusing purely on financial sector firms; Section 1.5 summarises the contributions this thesis makes to the literature; and finally Section 1.6 outlines the structure of the thesis.

1.2 Research aim and objectives

To facilitate the process of integration of European financial and banking markets the European Commission established that all listed firms had to publish their consolidated financial statements in accordance with IFRS from 2005.² During the IFRS adoption period two economic crises have occurred: the global financial crisis that engulfed European countries from 2008 and the European sovereign debt crisis which started in 2009. Financial institutions were hit the most by the crises,

² Also in Norway, a member of the European Economic Area (EEA), listed firm are required to use IFRS to prepare their financial statements since 2005. In the same line, all listed firms in Switzerland are required to use IFRS or the US GAAP since 2005.

and thereby the European governments heavily injected capital to the large financial firms. In this setting, the main aim of this thesis is to investigate the value relevance of IFRS and the effect of the financial crisis³ on European financial firms. In doing so, the thesis addresses several research objectives. First it assesses the change in the value relevance of financial statement information, namely book value of equity and earnings,⁴ before and after mandatory IFRS adoption by European financial firms. Second, it investigates the changes in the value relevance of book value of equity and earnings when the crisis hit. Third, the thesis examines the value relevance of the three levels of fair value as disclosed under IFRS 7.

To achieve these objectives, the thesis includes two empirical parts. The first part addresses the first two objectives. Specifically, it investigates the influence of IFRS adoption on the value relevance of accounting information by focusing on a sample of listed financial firms operating in the European Economic Area (EEA) and Switzerland over the period 1998-2012. The sample period is divided into two distinct phases: pre-IFRS adoption (1998-2004) and IFRS adoption (2005-2012). The first part also examines the value relevance of equity book value and earnings pre-crisis (2005-2007) and during the crisis (2008-2012). All tests are carried out for financial firms (including banks) and for the subsample of banks separately (for more details see Section 3.2.5 in Chapter 3).

The second part addresses the third research objective, which focuses on the fair value hierarchy under IFRS 7 effective since 2009. Specifically, it investigates the value relevance of the three levels of fair value disclosed in accordance with IFRS 7 for a sample of financial firms in the EEA and Switzerland over 2009-2012.

³ Throughout the thesis the terms “the crisis” and “the financial crisis” are used interchangeably to refer to the period from 2008 to 2012. This includes both the global financial crisis and the European sovereign debt crisis.

⁴ The terms “net income” and “earnings” are used interchangeably throughout the thesis.

1.3 Research questions⁵

As noted above, the empirical analyses in this thesis are divided into two parts: the first part addresses the impact of IFRS adoption and the financial crisis on value relevance of accounting information, and the second part focuses on the value relevance of fair value hierarchy.

1.3.1 The impact of IFRS and the crisis on value relevance

The first empirical part seeks to answer four research questions. IASB has developed International Financial Reporting Standards (IFRS) with the aim of providing accounting information that better reflects the economic position and performance of reporting entities compared to local accounting standards. Along with the comparability benefits associated with the increasing adoption of IFRS throughout the world, IFRS reduce allowable accounting alternatives, and hence limit managerial discretion (Barth et al., 2008). Thus, regulators as well as market participants expect substantial economic benefits around IFRS adoption. In general, IFRS adoption has received special consideration in the literature; yet there is relatively little attention paid to financial sector firms which are more exposed to fair value accounting relative to other sectors. Therefore, the first part of this thesis concentrates in providing answers to the following research question:

1A. Does the value relevance of accounting information increase following mandatory IFRS adoption by financial firms?

As discussed above, reporting entities are required to prepare both a balance sheet and an income statement under IFRS. These two statements fulfil different valuation roles: the former provides information on firm liquidation values,⁶ while the latter gives information about the firm's unrecognised net assets. Previous studies (e.g. Barth et al., 1998a; Davis-Friday et al., 2006) show that the value relevance of the book value of equity increases, while that of net income decreases

⁵ Chapter 3 includes the hypotheses, which correspond to the research questions listed in this chapter.

⁶ Liquidation values are the amount of net assets that are available in case of default (Barth et al., 1998).

when a firm's financial health deteriorates or during an economic crisis. Given the increased exposure to fair value accounting, the shift in the valuation roles from the income statement to the balance sheet in the times of crisis is likely to become apparent for financial firms. Therefore, the second research question is formulated as follows:

2A. Does the value relevance of equity book value increase, while that of net income decrease for financial firms as the financial crisis hits?

Prior research suggests that country-level institutional environment as well as firm-level corporate governance mechanisms can play a complementary role in explaining the quality of financial reporting. This is particularly true during a financial crisis, as shown in prior studies such as Choi et al. (2011) and Vyas (2011). That is, the value relevance of the balance sheet and the income statement in times of a crisis are expected to be affected by both the strength of the institutional environment, and the quality of corporate governance practices at firm level. Thus, the first part also seeks to answer the following two research questions:

3A. Does the value relevance of equity book value increase and that of net income decrease for firms operating in countries characterised by a weak institutional environment⁷ in times of financial crisis?

4A. Does the value relevance of equity book value increase and that of net income decrease for firms with weak corporate governance mechanisms in times of financial crisis?

1.3.2 Value relevance of fair value hierarchy

The second empirical part addresses the value relevance of fair value hierarchy under IFRS 7 through answering three research questions. The accounting literature suggests that fair value accounting information is typically value relevant to investors and the value relevance of fair value information varies with its reliability. The disclosure requirements under IFRS 7 to

⁷ Section 3.2.4. describes the variables that are used in this thesis to measure the strength of institutional environment and corporate governance.

categorise the inputs to the fair value measurements offer a powerful setting to assess whether the value relevance of more reliable fair value amounts (i.e. level 1 and level 2) is different from that of less reliable fair value estimates (i.e. level 3). Therefore, the first question to be answered in the second part is:

1B. Is the value relevance of level 1 and level 2 fair values higher than the value relevance of level 3 fair values?

The following two questions concern the impact of both the institutional environment and firm-level corporate governance on the value relevance of fair value hierarchy. These questions are motivated by the greater subjectivity and information asymmetry problems associated with fair value estimates in the absence of active markets. Recalling that the characteristics of the institutional environment and corporate governance mechanisms are likely to have an influence on the reliability concerns of fair value estimates, the second and third questions in the second part are stated as follows:

2B. Does the institutional environment have a greater impact on the value relevance of level 3 fair values than on the value relevance of level 1 and level 2 fair values?

3B. Do corporate governance mechanisms have a greater impact on the value relevance of level 3 fair values than on the value relevance of level 1 and level 2 fair values?

1.4 Financial firms

Financial firms facilitate business environment and firms financing. Therefore, the failure of such firms is more likely to cause greater harm to the whole economy compared to other, non-financial, entities (Jorian, 2009; Acharya and Richardson, 2009; Beatty and Liao, 2014). Yet they are often excluded from studies that test the changes in the value relevance of accounting information following IFRS adoption. This thesis aims to help fill this gap by focusing on financial firms for several important reasons. Firstly, and most importantly, the fair value accounting underlying

IFRS, as opposed to historical cost accounting, makes the financial sector potentially more exposed to changes in accounting practices following mandatory IFRS adoption compared to non-financial firms. For many EEA countries, mandatory IFRS adoption represented a substantial shift in financial reporting (Barth et al., 2014), given the fair value emphasis of IFRS compared to local accounting standards applied prior to 2005. This is of particular relevance to financial firms since they tend to hold a considerable proportion of their assets and liabilities in the form of financial instruments recognised at fair value under IFRS. Secondly, financial institutions that engage in traditional banking activities are required to report loan loss provisions (LLPs) which are considered as a key accounting choice that may affect reported earnings significantly.⁸ It is expected that those firms (i.e. banks) would be specifically affected by IFRS requirements for LLPs compared to those stipulated in many European countries before IFRS adoption (Gebhardt and Novotny-Farkas, 2011).⁹ Thirdly, the differences in accounting standards across countries may decrease the comparability of firms' financial performance. This is especially true for financial institutions as their financial statements are typically more opaque compared to those of non-financial firms (Anandarajan et al., 2011; Beatty and Liao, 2014).

Furthermore, as discussed above, one of the key aims of this thesis is to employ a sample of financial firms to examine the impact of the financial crisis on the valuation roles of the balance sheet and the income statement. In this context, it seems reasonable to expect that the industry-specific characteristics will have some effect on the value relevance of financial statement information: as observed by Barth et al. (1998a), changes in the valuation coefficients of book value of equity and earnings could be driven by growth, risk, earnings persistence and accounting practices that are associated with a specific industry. Compared to other industries, financial firms

⁸ LLPs represent the excepted loan losses as estimated by bank management. For a more detailed explanation of LLPs and its accounting treatment, see Rayan (2007: 97-100).

⁹ Specifically, IAS 39 requires an incurred loss model to report LLPs in comparison to forward looking model stipulated in Europe prior to IFRS adoption (Gebhardt and Novotny-Farkas, 2011).

hold more financial assets and liabilities; and fair value accounting results in more volatile income numbers in comparison to the timely recognition of balance sheet items. Hence, their balance sheets are expected to be of increasing importance for valuation purposes (i.e. become more value relevant), which is likely to be apparent during times of crisis. Besides, financial firms were severely affected by economic crises. In fact, European financial institutions, especially those in the Eurozone, were hit twice over the study period: first during the global financial crisis from 2008 onwards, and then during the European sovereign debt crisis that started at the end of 2009. In the same vein, this thesis focuses on financial firms in testing the value relevance of the three levels of fair value hierarchy under IFRS 7. The disclosure of the fair value hierarchy is not specific to any particular industry; however, financial firms tend to have significant amounts of financial instruments measured at fair value. Consequently, the relevance of fair value hierarchy disclosures is expected to be more pronounced for financial firms than for firms from other industries.

1.5 Research contribution

This thesis contributes to the literature in several ways.

Concerning the first empirical part which focuses on the capital market consequences of mandatory IFRS adoption and the financial crisis for a sample of European financial firms, it is possible to identify a number of key contributions. The first part provides empirical evidence on the impact of IFRS adoption on the value relevance of accounting information of a single industry, namely financial firms. In contrast, when investigating the changes in the value relevance of accounting information following IFRS adoption prior research typically uses samples that include firms from a wide spectrum of industries and often exclude financial institutions (e.g. Gjerde et al., 2008; Devalle et al., 2010; Liu et al., 2011; Tsalavoutas et al., 2012). It might be difficult to find conclusive evidence by combining different industries with

various characteristics in a single sample. This warrants further research to examine the effect of IFRS adoption on financial firms.

This study contributes to the literature (e.g. Agostino et al., 2011) also by extending the study period to cover eight years after IFRS adoption rather than only early years of adoption. The change in the quality of accounting information as a result of IFRS adoption might be more noticeable in the medium to long-term rather than in the early years of IFRS adoption (Callao et al., 2007; Houque et al., 2012). Interestingly, Kvall and Nobes (2010) and Kvall and Nobes (2012) show that firms in IFRS transition period continue their pre-IFRS national accounting traditions. In addition, this thesis contributes to the existing studies on the changes in the valuation roles of the balance sheet and income statement figures as a function of financial health. In particular, it revisits the distinctive valuation roles of the balance sheet and the income statement in the context of the most recent financial crisis. Also, it contributes to the ongoing discussion on the impact of fair value accounting during the time of financial crisis, given that the financial statements of firms under study are prepared under fair value-oriented accounting standards (IFRS), along with that fact that financial firms are relatively more exposed to fair value accounting than other industries.

Moreover, in contrast to prior studies measuring the quality of country-level corporate governance (such as Davis-Friday et al., 2006; Daske et al., 2008; Anandarajan et al., 2011; Houque et al., 2012), the present thesis employs a measure for firm-level rather than country-level governance quality. Previous studies report that there is a wide variation in firm-level corporate governance practices within a country (Klapper and Love, 2004; Durnex and Kim, 2005). So, even with the same institutional settings, firms adopt different corporate governance mechanisms to mitigate agency problems, which might result in differences in the valuation characteristics of financial statements across firms.

Concerning the second part on the value relevance of fair value hierarchy under IFRS 7, the thesis also contributes to a large body of literature on fair value accounting. Prior studies have explored the value relevance of fair value hierarchy under Statement of Financial Accounting Standards No. 157 (SFAS No. 157)¹⁰ for firms listed on the US markets (i.e. Kolev, 2009; Song et al., 2010; Goh et al., 2015), with no evidence, as far as I am aware, from other contexts. This study extends previous research by providing empirical evidence for a sample of financial firms listed on the EEA and Switzerland stock markets, of which many are considered less developed than those in the US. It also examines the association between the strength of the institutional environment, in addition to firm-level corporate governance mechanisms, and the value relevance of fair values. This responds to the call for research to examine whether the relevance and reliability of fair values vary across countries (Landsman, 2007). Interestingly, the results suggest that country-specific institutional features affect the value relevance of financial instruments measured at fair value with no active markets (i.e. level 3 fair value). Again, this thesis investigates the impact of corporate governance practices at firm level, rather than at country-level in prior studies (see, for example, Daske et al., 2008; Anandarajan et al., 2011), on the value relevance of fair value levels. This is because the value relevance of fair value estimates across firms is likely to be influenced by the different corporate governance mechanisms at firm level, adopted to mitigate information asymmetry problems.

1.6 Structure of the thesis

The remainder of the thesis proceeds as follows:

Chapter 2 presents a review of the existing body of research relevant to the main scope of this study, and is divided into two main parts corresponding to the two empirical parts in the thesis.

Part I includes a survey of previous studies on the impact of IFRS adoption and of the financial crisis on the value relevance of accounting information. Specifically, it reviews the accounting

¹⁰ Statement of Financial Accounting Standards No. 157 was issued by Financial Accounting Standards Board (FASB) in the United States (US) requiring fair value hierarchy disclosure since 2008.

literature concerning mandatory IFRS adoption distinguishing between single and multi-country studies. Also, it gives an account of the literature on the value relevance of accounting information in times of financial crisis, and of the literature that addresses the impact of institutional environment and corporate governance factors. In Part II, the focus is shifted to prior research that addresses the value relevance of the fair values for financial instruments. It starts with the literature on fair value accounting before SFAS No. 157 and IFRS 7, and then it analyses the recent studies on fair value disclosure requirements under SFAS No. 157 and IFRS 7, and those that shed light on the impact of institutional environment and corporate governance on the quality of fair value information.

Chapter 3 details the research methodology adopted in this study. The chapter is divided into two parts corresponding to the two empirical parts included in this thesis. For each part, the chapter presents the relevant hypotheses, and then provides a description of the models that will be used to test the stated hypotheses empirically, in addition to the sample selection procedures. Also, the chapter includes a description of the institutional environment and firm-level corporate governance variables that are employed in the study.

Chapter 4 provides the descriptive statistics and discusses the findings of the first empirical part. It first presents the findings on the changes in the value relevance after mandatory IFRS adoption, and on the impact of the financial crisis on the value relevance of the balance sheet and income statement numbers. Finally, it addresses the impact of country-level institutional characteristics as well as firm-level corporate governance mechanisms.

Chapter 5 provides and discusses the descriptive statistics and the empirical findings of the second empirical part. It starts with the results of testing the value relevance of fair value hierarchy, after which the effects of both the institutional environment and corporate governance factors are addressed.

Chapter 6 offers a summary of the thesis along with the main conclusions based on the results from testing the research hypotheses. It discusses the implications and limitations of the thesis and presents some avenues for future research.

Chapter 2: Literature Review

2.1 Introduction

Accounting information is considered value relevant when it has a statistical association with equity market value or return. Operationally, the value relevance of accounting information is measured by the explanatory power from a regression of share price (hereafter the “price model”) or return (hereafter the “return model”)^{11,12} against accounting information. Such measure can capture the relevance and reliability of accounting information (Francis et al., 2004), the two major features of information in the financial statements under the IASB’s conceptual framework applied up to 2010 (IASB, 2001).¹³ Consistent with the objectives of financial reporting within that framework, the value relevance is considered as a direct proxy for decision usefulness. Specifically, it reflects the role of accounting information in providing investors with the relevant information for valuation purposes. Furthermore, the theoretical background of value relevance models depends largely on a definition of value relevance as “the ability of financial statement information to capture or summarise information, regardless of source, that affects share values” (Francis and Schipper, 1999: 327). Such underlying definition matches the general purpose of financial reporting in providing “information to help existing and potential investors, lenders and other creditors to estimate the value of the reporting entity”, as stated in the most recent IASB *Conceptual Framework for Financial Reporting* issued in September 2010 (IASB, 2010: A22). The empirical evidence shows that differences in accounting practice imply variations in the value relevance of financial statements to investors both at national and international level (see, e.g., Barth and Clinch, 1996, 1998; Dobija and Klimczak, 2010; Barth et al., 2008). This might

¹¹ For a detailed explanation of the development of the price and return models see Section 3.2.2 in Chapter 3.

¹² The estimated coefficients from the price and return models are also used to measure the value relevance of accounting numbers.

¹³ In the new IASB Conceptual Framework, for the financial information to be useful, it must be relevant and faithfully represent what it purports to represent.

be one reason why changes in the value relevance of accounting information due to IFRS adoption have been investigated extensively in prior studies.

Over the past few decades there has been a considerable shift in financial reporting toward more fair value-based financial statements. In this context, the accounting literature has also examined the decision usefulness of fair value information to investors. A relatively large number of studies investigate the value relevance of fair value information. An accounting amount is considered value relevant when it has a statistical association with equity market value or return (Barth et al., 2001; Barth and Clinch, 2009). That is, if a recognised or disclosed fair value amount has a valuation coefficient that is statistically different from zero (after controlling for other financial statement information), this amount is considered relevant and reliable enough to be reflected in equity market value. Financial institutions typically hold large proportion of financial assets and liabilities in their financial statements (compared to non-financial firms); hence, much of the fair value research focuses on financial sector firms.

This chapter is divided into two main parts. Part I (Section 2.2) provides a detailed survey of the published literature on the impact of mandatory IFRS adoption and the financial crisis on the value relevance of accounting information. Specifically, Section 2.2.1 provides a review of previous studies concerning mandatory IFRS adoption. To this end, a distinction is made between studies that focus on a single country and studies that are carried out in a multi-country context as well as studies relating to IFRS adoption by financial firms. Section 2.2.2 focuses on published studies on the value relevance of accounting information surrounding the financial crisis. Section 2.2.3 and 2.2.4 review previous literature on the association between accounting information quality and institutional environment factors as well as corporate governance mechanisms, respectively. Finally, Section 2.2.5 offers a summary and critical discussion of the studies reviewed in Part I.

Part II of this chapter (Section 2.3) reviews the fair value accounting literature corresponding to the second empirical part carried out in this thesis on fair value hierarchy. Specifically it presents and discusses the empirical evidence from prior studies concerning the value relevance of fair value recognition and disclosure. The focus is centred on the fair value of financial assets and liabilities as the fair value hierarchy disclosure requirements under IFRS 7 are limited to financial instruments. The review starts in Section 2.3.1 with the literature that empirically investigates the value relevance of fair value information prior to SFAS No. 157 (issued by FASB) and IFRS 7 (issued by IASB). A distinction is made between the studies conducted in the United States (US) context, which are dominant in the fair value literature, and those in non-US (or multi-country) context. Section 2.3.2 presents the prior literature on fair value disclosure requirements based on SFAS No. 157 and IFRS 7. Then, Section 2.3.3 reviews the empirical studies that shed light on the impact of institutional environment and corporate governance on the quality of fair value information. Section 2.3.4 provides a summary and critical discussion of the reviewed literature in Part II.

Finally, Section 2.4 concludes the chapter.

PART I

2.2 Literature review on the impact of IFRS and the crisis on value relevance

2.2.1 Value relevance of IFRS

With the increasing number of countries requiring listed firms to prepare their financial statements under IFRS, the accounting literature has investigated the impact of mandatory IFRS adoption on the value relevance of financial statement information. In reviewing this literature, a distinction is made between single-country (in Section 2.2.1.1) versus cross-country studies (in Section 2.2.1.2). In addition, Section 2.2.1.3 reviews prior literature that addresses the impact of IFRS adoption on the accounting information quality of financial firms.

2.2.1.1 Single-country studies

Focusing on Norwegian firms, Gjerde et al. (2008) analyse whether the financial statements of 2004 are more value relevant when restated in accordance with IFRS rather than local accounting standards. Based on a sample of 145 firms listed on Oslo Stock Exchange, they employ both the return and the price models. The analysis reveals little evidence of increasing value relevance of accounting information after the mandatory adoption of IFRS in 2005.

Similarly in Portugal, Morais and Curto (2008) use a sample of 34 Portuguese listed over 1999-2006. Based on the explanatory power of the price model, they document a decrease in the value relevance of accounting information over the two years of IFRS (2005-2006) compared to the period of domestic accounting standards (1995-2004).

In Sweden, Paananen (2008) uses a sample of 376 firms for two years before IFRS adoption (2003-2004) and two years of mandatory IFRS adoption (2005-2006). Using the price model, the results show a decrease in the value relevance of accounting information – although it is not statistically significant – following IFRS adoption.

In Romania, where listed firms were mandated to report their financial statements under IFRS since 2001, Filip (2010) examines the impact of such adoption on the value relevance of

accounting information. The study employs the return model for a sample of 280 firm-year observations (related to 48 firms) over the period from 1997 to 2004. The empirical analysis shows that the value relevance of accounting information is significantly higher in the period of IFRS adoption (2001-2004) compared to pre-IFRS adoption period (1997-2000).

In Poland, Dobija and Klimczak (2010) investigate the changes in the value relevance of accounting information over two events, the new Polish accounting regulation introduced in 2000 and the mandatory adoption of IFRS in 2005. After excluding financial sector firms they use a sample of 856 firm-year observations over 1997-2008. Employing the return model with a dummy variable for IFRS adoption, the results show that there is no improvement in the value relevance of accounting information following the two periods of interest (i.e. the new Polish accounting standards and IFRS adoption).

In the Portuguese context, Oliveira et al.'s (2010) findings suggest a decrease in the value relevance of earnings compared to no effect on that of equity book value following the implementation of IFRS in 2005. Using the price model as the baseline model, the study is conducted based on a sample of 354 Portuguese non-financial listed firms over 1998-2008.

Using Australian data over the period from 1990 to 2008, Chalmers et al. (2011) find weak evidence of an increase in the value relevance of financial reporting after the mandatory IFRS adoption in 2005. They conduct the study using the price model for 20,025 firm-year observations.

Concerning the impact of IFRS adoption in highly regulated market, Liu et al. (2011) evaluate whether the quality of accounting information has increased after mandatory IFRS implementation in China since 2007. They use a sample of 870 non-financial firms over 2005-2008. Based on both the price and return models, their findings indicate an increase in the value relevance of financial statement information following the mandatory adoption of IFRS in China.

In Greece, Karampinis and Hevas (2011) investigate the changes in accounting quality after IFRS adoption in 2005. The value relevance, measured based on both the price and the return models, is used as one of their proxies for the quality of accounting information. The study covers the period from 2002 to 2007 for a sample of 869 firm-year observations. The analysis shows that IFRS adoption has no significant impact on the value relevance of accounting information. Consistent with Karampinis and Hevas (2011), Tsalavoutas et al.'s (2012) empirical findings indicate no significant change in the value relevance of financial reporting in the post IFRS adoption period (2005-2008) compared to local accounting standards period (2001-2004) in Greece. They employ both the price and return models for a sample of 1,861 non-financial firm-year observations.

Many factors may affect the quality of accounting information rather than accounting standards such as incentives, enforcement and ownership structure (Ball, 2006; Holthausen, 2009). In this context, the studies reviewed above rely on one country sample, allowing them to control for internationally different and confounding factors. This in turn enhances the power of the tests and improves the reliability of findings. However, the results of single country study are less generalisable to other country contexts. In the present research, the relatively small number of financial firms in most EEA countries does not provide sufficient number of observations to carry out reliable single-country studies.

2.2.1.2 Multi-country studies

Moving to multi country studies, Morais and Curto (2009) conclude that the value relevance of financial statements over the first year of mandatory IFRS adoption is higher in comparison to those reported in the period of domestic Generally Accepted Accounting Principles (GAAP). They use a large sample of 6,977 European listed firms from 14 different countries in the EEA over 2001-2005. The study is conducted based on the price model. In a further analysis they evaluate the impact of institutional environment on the value relevance of accounting information

after IFRS adoption. The results suggest that in the countries where accounting and tax are clearly separated financial statement information tends to be more value relevant. Surprisingly, the value relevance of financial reporting appears to be higher for firms listed in countries characterised by weaker legal enforcement mechanisms.

Similarly, Devalle et al. (2010) investigate whether there has been any improvement in the value relevance of accounting information following the mandatory introduction of IFRS. They use data for 3,721 companies listed on five European stock exchanges, Frankfurt, Madrid, Paris, London, and Milan, over the period from 2002 to 2007. Employing both the price and return models for the entire sample shows that there has been an increase in the value relevance after IFRS adoption. Comparing the pricing coefficients suggests that value relevance of net income has increased in comparison to a decrease in value relevance of book value of equity.

Focusing on the first year of IFRS adoption, Aubert and Grudnitski (2011) study the impact of IFRS adoption in 13 EEA countries and Switzerland. Based on a sample of 3,530 firms, the stock return is regressed on the reported earnings. The results show a positive association between earnings and stock return for the entire sample and in the countries of Belgium, Finland, France, Greece, Italy, the Netherlands, Norway, Sweden and the United Kingdom (UK). However, adding a dummy variable for IFRS adoption shows an insignificant change in the value relevance of accounting information when it is prepared in accordance with IFRS rather than domestic GAAP.

Likewise, Clarkson et al. (2011) assess whether the value relevance of book value of equity and net income has changed for the financial statements issued in 2004 under local GAAP and their IFRS comparative figures reported in 2005 (i.e. the first year of IFRS adoption). For a sample of 3,488 firms in 14 EEA countries and Australia they employ the price model. The countries under study are classified into two groups, common law and code law countries, according to the

characteristics of their legal systems. Based on the explanatory power of the price model, the findings suggest no improvements in the value relevance for both sub-samples of code law and common law countries.

2.2.1.3 IFRS adoption and financial firms

The studies surveyed in the previous sections use samples including firms from a broad spread of industries. Industry-specific characteristics, such as growth, risk, earnings persistence and accounting practices, can have an influence on the value relevance of accounting information (Barth et al., 1998a; Anandarajan et al., 2011). Moreover, as discussed in Chapter 1, the literature on the impact of IFRS adoption on the value relevance of accounting information often excludes financial firms due to their distinct characteristics (e.g. Oliveira et al., 2010; Liu et al., 2011; Tsalavoutas et al., 2012). Taken together, there is a clear need for research to evaluate the impact of IFRS adoption on the value relevance as a proxy for accounting information quality of financial firms.

A stream of studies uses earnings management, as a proxy of financial statement quality, to investigate the impact of IFRS adoption specifically on the banking industry. Earnings management occurs when managers exercise their discretion in financial reporting and/or in structuring transactions to “either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers” (Healy and Wahlen, 1999: 368). In terms of the key literature, Gebhardt and Novotny-Farkas (2011), for example, investigate whether there is any change in the use of loan loss provisions (LLPs) as a tool for earnings management and capital management after IFRS adoption. The variable LLPs is regressed on non-performing loans, regulatory capital, and earnings before tax and LLPs. They also include several other explanatory variables, namely, changes in non-performing loans and changes in total loans. All the independent variables are interacted with a dummy variable for IFRS adoption. The analysis is conducted for a sample of

90 banks listed in 12 European countries over the period from 2000 to 2007. The results suggest that the introduction of IFRS in 2005 results in less earnings management behaviour of European banks. Interestingly, this effect is less pronounced for banks from countries characterised by stricter bank supervision, widely dispersed bank ownership and for banks that are cross-listed in the US. In another 2011 study, Leventis et al. report consistent results where IFRS adoption period appears to result in a decline in earnings management behaviour by European banks. The authors regress loan loss provisions on earnings before tax and LLPs, regulatory capital ratio and a set of control variables, interacted with the IFRS adoption dummy variable. Their study is conducted using a sample of 910 bank-year observations related to 91 European banks over 1999-2008.

Relatively few studies have focused exclusively on financial firms in examining the changes in the value relevance of financial statement as a result of IFRS adoption. Agostino et al. (2011) evaluate the impact of mandatory IFRS adoption on financial institutions listed in 15 countries in the EEA over 2000-2006. They use the price model with an interaction dummy variable for IFRS adoption to evaluate the impact of IFRS adoption on the valuation coefficients of book value of equity and earnings separately. Agostino et al. also compare the explanatory power of the price model between the two periods of interest, pre-IFRS adoption and IFRS adoption. Their findings suggest that the value relevance of earnings has increased following IFRS adoption for a sample of 1,201 financial firm-year observations. For equity book value, the results are less clear-cut. Moreover, the model explanatory power (R-squared), as a measure of the combined value relevance of book value of equity and net income, tends to be higher after IFRS adoption suggesting an increase in the value relevance following the implementation of IFRS. In addition, they run the price model for five countries, namely Denmark, Italy, France, Germany and the UK. The largest increase in the value relevance of earnings reported for Germany and Italy and the smallest for the firms in the UK. They interpret these results by suggesting that IFRS require

more disclosure in comparison to local GAAP in continental European countries than in common law countries; and the quality of financial statements reported under the UK GAAP is at least as high as that of financial statements prepared based on IFRS. However, the subsample of Danish banks shows an opposite direction to the entire sample results as the value of book value of equity (earnings) has increased (decreased) following the mandatory introduction of IFRS.

Similarly, a more recent study by Manganaris et al. (2015) assesses the change in the value relevance of equity book value and earnings as a result of IFRS adoption. The sample comprises of 2,223 firm-year observations related to 178 financial firms listed in 15 European countries (in the EEA) over 1998-2011. They employ the price model where accounting information is interacted with a dummy variable for IFRS adoption. The study shows that there is a significant increase in the value relevance of earnings and a significant decrease in that of equity book value after mandating IFRS. In a further analysis, they investigate the influence of the legal origin and the level of legal enforcement at country level on the post-IFRS value relevance. The findings suggest that IFRS adoption has not resulted in a significant change in the value relevance of the French and German-origin groups, while it has a positive (negative) impact on the value relevance of book equity book value and earnings of Scandinavian (English) group. Firms in countries with high level of enforcement present greater value relevant book value of equity and earnings following IFRS adoption. It is worth mentioning that Manganaris et al. do not address the change in the combined value relevance of book value of equity and earnings following IFRS adoption. The next section reviews published studies examining the changes in the accounting information quality during the crisis period.

2.2.2 Value relevance and the financial crisis

An early study by Barth et al. (1998a) evaluates the impact of firms' financial health on the valuation coefficients of equity book value and net income. The study is conducted based on a sample of 396 US firms that filed for bankruptcy and delisted over 1974-1993. Firstly, they run

a regression of market value on both equity book value and reported net income for each of the five years before bankruptcy. The results show that the valuation coefficient of equity book value increases over the period of five years. At the other extreme, the estimated coefficient on net income appears to decrease over the same period. Second, using a larger and pooled sample of 17,966 firm-year observation in the US, they test the value relevance of the balance sheet and income statements conditional on firm's financial health. The price model includes an interaction dummy variable coded one for firms with lower financial health (based on actual or effective bond ratings) and 0 otherwise over 1988-1993. The findings indicate that for less financially healthy firms the coefficient on interaction between the dummy variable and book value of equity is positive and significant, while the corresponding interaction with net income is negative and significant. Overall, firm's financial health appears to have an impact on the valuation role of book value of equity (increase) and reported net income (decrease).

Graham et al. (2000) examine the incremental value relevance of book value of equity and net income as a result of the Asian financial crisis in 1997. Based on a sample of 8,116 quarter-firm observations in Thailand, the authors run a regression of firms' market value on book value of equity and net income then the market value on each of them separately. They decompose the explanatory power of the main regression (i.e. that includes book value and earnings) into the incremental component attributable to equity book value, that attributable to net income and the component common to both equity book value and net income. That is, the incremental value relevance of equity book value (net income) is calculated by subtracting the relative value relevance of net income (equity book value) from the total value relevance. The study covers the period from the third quarter of 1992 to the first quarter of 1998. To study the impact of financial crisis, they apply the study to a sub-period of the four quarters before July 1997 (pre-crisis period) and to the four quarters after July 1997 (crisis period) with a total sample of 2,947 observations. Whereas the incremental value relevance of equity book value increases, that of net income

decreases when the Asian financial crisis hit. The results, thus, support the prediction of different valuation roles of equity book value and net income figures surrounding the financial crisis.

Similarly, Davis-Friday et al. (2006) examine the impact of the Asian financial crisis on the value relevance of equity book value and net income in four countries. The study employs a sample of 158 listed firms in Indonesia, 217 in South Korea, 271 in Malaysia and 389 in Thailand. The firms' data are collected for two years, 1996 as pre-financial crisis year and 1997 as the year of Asian financial crisis. The market value is regressed on the book value of equity and net income with an interaction dummy variable for the financial crisis. Furthermore, The authors evaluate the crisis effect after including variables to measure country-level institutional environment as well as the type of accounting regime (investor-oriented versus tax-based financial reporting standards). Their results indicate different effects of financial crisis in different countries. More specifically, during the financial crisis in Indonesia and Thailand, the value relevance of earnings decreases, whereas the value relevance of book value increases. Moving to Malaysia, the estimated coefficients on both earnings and book value decreased when the crisis hit. In Korea, there is not a significant impact of the financial crisis on the valuation coefficients of book value of equity and reported earnings. Further analysis shows that country-specific institutional factors play a role in the extent of changes in the value relevance of equity book value (decrease with weak investor protection), but not earnings. Finally, they found that accounting system, classified either inventor-oriented or tax-based, affects the extent of changes in the value relevance of equity book value as a result of crisis.

One of the limitations in Davis-Friday et al.'s study is that the country-level variables, on one hand, and the accounting and market variables, on the other hand, are from different periods. Firms' financial statements information and market values are for 1996 and 1997, whereas country-level variables are drawn from the work of La Porta et al. (1998) and Saudagaran and

Diga (1997) using data from different time periods.¹⁴ This is expected to result in a less powerful test of the effect of country-level institutional environment on the value relevance of book value of equity and net income. The present thesis addresses this concern by using data on country-level variables from the same period of accounting and market data. In addition this thesis extends the work of Davis-Friday et al. (2006) by using corporate governance measures that vary at firm level and might have an effect on the value relevance during the financial crisis (see Section 3.2.4).

A branch of studies questions whether a financial crisis affects the value relevance of specific components of the balance sheet and income statement. Fen et al. (2010), for example, reports a significant decrease in the value relevance of net income components (the valuation gain/loss on financial instruments, and net income number after the deduction of valuation gain/loss). The results for book value are less clear-cut as it varies based on industry classification. Using the price model with an interaction dummy variable for the crisis period, the study covers the period from the first quarter of 2007 to the first quarter of 2009 using a sample of 4,102 firm-quarter observations in Taiwan. The valuation gain/loss on financial instruments is added as independent variables after deduction from the net income; the same is applied to unrealised gain/loss on financial instruments and equity book value.

In the same spirit, Choi et al. (2011) investigate the changes in the value relevance of reported net income and its components around the Asian financial crisis 1997-1998. The analysis is conducted by a regression of stock return on the different components of earnings with an interaction dummy variable representing the crisis period. They run the study models for a sample of 10,406 firm-years related to firms listed in nine Asian countries¹⁵ from 1995 to 2000. In the period of financial crisis, the empirical evidence reveals a significant decline in the value

¹⁴ For example the rule of law from La Porta et al. (1998) is calculated using data from 1982-1995. Saudagaran and Diga (1997) report country level audit reporting quality based on sources from 1995.

¹⁵ Hong Kong, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand.

relevance of discretionary accruals but no significant change in that of non-discretionary earnings. Based on La Porta et al.'s (1997) legal enforcement score they found that the decrease in the value relevance of discretionary accruals over the crisis period was more severe for the firms listed in the countries with low enforcement level. Additionally, at firm level, the results indicate a greater decline in the value relevance of discretionary accruals and operating cash flows for firms with high information asymmetries than for firms with low information asymmetries. In addition to using only one proxy to measure the institutional business environment, another limitation of Choi et al.'s study is that the institutional variable data are from different period of the accounting and market information.

Another stream of accounting literature investigates the impact of the financial crisis on the quality of accounting information through earnings management. For instance, Filip and Raffournier (2012) investigate the impact of financial crisis in 2008 and 2009 on the accounting information quality of European firms. They use a sample of 8,266 firms in 16 European countries in the EEA and Switzerland over 2006-2009. Two metrics of income smoothing coupled with three accrual quality measures are used in the study. Compared to the pre-crisis period, the findings suggest a decrease in earnings management during the financial crisis. However, this is not the case for all the countries represented in their sample. Also, the findings suggest that country-specific factors (institutional and market factors) are associated with income smoothing metrics, but that is not the case with accrual quality measures.

In addition to earnings management, Iatridis and Dimitras (2013) examine whether there has been any change in the value relevance during the period surrounding the financial crisis in Europe. Their analysis is focused on firms audited by a Big 4 auditor¹⁶ and listed in five European countries, namely Greece (138 firms), Ireland (44 firms), Italy (242 firms), Portugal (46 firms), and Spain (112 firms) over the period from 2005 to 2011. Earnings management is measured

¹⁶ Big 4 auditors are PricewaterhouseCoopers, Deloitte, Ernst & Young, and KPMG.

based on discretionary accruals and value relevance based on the explanatory power of the price model. For both measures of accounting quality, the results are not conclusive and tend to vary across countries. For instance, Portuguese and Greek firms reported lower value relevant financial statements in the crisis years compared to the pre-crisis period. In contrast, the value relevance of financial reporting tends to be higher after the crisis hit in Ireland, Italy and Spain.

An area for accounting discretion during the time of financial crisis is the timing of financial firms' actual write-downs of assets. Vyas (2011) introduces a measure to capture the timing of actual write downs, and then compares it to the devaluation that is implied in exposure-specific credit indices such the ABX. For a sample of 66 US financial firms that reported write downs in the period 2007-2008, the author reports that actual write-downs are generally less timely compared to the devaluation implied by credit indices; and in general the timeliness of write-downs tend to vary across banks. In line with the notion that there is an association between corporate governance and accounting information quality, the study shows that firms with strong corporate governance mechanisms tend to report more timely write downs.

Focusing also on financial firms, Cohen et al. (2014) study the earnings management behaviour by banks during the financial crisis. The study is conducted based on a sample comprising of all listed banks in the US during the 1997 through 2009. The overall sample consists of 4,112 bank-year observations. The main model is the regression of crash risk¹⁷ on the level of earnings management with an interaction dummy variables representing the period of financial crisis. Earnings management is measured by its two components, LLPs and securities gain/loss management. Their findings suggest that earnings management by banks has little effect on downside risk during pre-crisis period, but appears to have a big impact in times of financial crisis.

¹⁷ Crash risk is assigned a value of 1 if in any week in that year the firm-specific return is less than -3.09 times the bank-specific standard deviation.

In part of their study, Beccalli et al. (2015) investigate earnings management behaviour using LLPs by European banks. The study is conducted using a sample of 487 bank-quarter observations related to 55 banks domiciled in 13 EEA countries and Switzerland over 2004-2008. The level of earnings management is measured by the residuals from a regression of LLP on the business activities that determinate LLPs (previous LLPs, bank performance and capital regulation, in addition to several environmental factors). The empirical analysis shows that banks tend to engage in earnings management activities via LLPs before the crisis but not in the crisis period. In particular, they find that earnings management activities are positively associated with higher probability of meeting or beating analyst consensus only for the pre-crisis period. Furthermore, the study documents no statistical association between earnings management activities and cumulative adjusted returns.

2.2.3 Value relevance and institutional environment

The value relevance of the summary measures of the balance sheet versus the income statement might vary across countries according to the characteristics of legal and institutional business environment. A stream of literature classifies accounting system based on the characteristics of legal systems, mainly into two groups, common law and code law (see, for instance, Joos and Lang, 1994; Leuz et al., 2003; Barth et al., 2012). In the countries where the legal system is classified as common law, such as the UK and the US, financial reporting practices are mainly determined by private sector bodies; and shareholders are the main sources of financing through regulated markets. The purpose of accounting standards therefore is to satisfy the information needs of existing and potential investors. On the other hand, banks and government are the main providers of capital in code law countries, like for example France and Germany. Thus, accounting standards are set to provide information mainly for taxation purposes since investors often have access to private information with less reliance on financial statements.

Common law countries are characterised by strong protection for outsiders compared to their code law counterparts. Thus accounting standards are expected to be of higher quality in common law countries. Based on this argument, Black and White (2003) examine the variation in the relative value relevance of equity book value and net income across countries, namely, Germany, Japan and the US. After excluding the financial institutions, the study sample consists of 36,143 firm-year observations for firms listed in the countries under study over the period from 1986 to 1998. The empirical results indicate that book value of equity seems to be of more value relevant relative to net income in Germany. For the US firms net income appears to be more value relevant for positive earnings and large firms, while for Japanese firms the results are less clear-cut.

A number of previous studies classifies countries into common law and code law in investigating the impact of IFRS adoption on the quality of accounting information. IFRS are largely developed based on accounting standards in common law countries (Bartov et al., 2005; Barth et al., 2014). IFRS are therefore expected to have more positive influence on the value relevance of code law countries (Bartov et al., 2005, Armstrong et al., 2010). In line with this expectation, Prather-Kinsey et al. (2008) find a stronger effect of mandatory IFRS adoption on the value relevance of accounting information as well as cost of capital for code law group in comparison to common law group. They employ the price model for a sample of 157 companies from 15 EAA countries and Switzerland in 2004 and 2006.

A similar study by Lourenço and Curto (2008) uses a sample of 348 firms listed in France, Germany, Italy, the Netherlands, Spain, and the UK. Their study covers the period of two years pre-IFRS adoption (2003-2004) and first two year of mandatory IFRS adoption (2005-2006). By employing the price model, the empirical evidence indicates that the quality of accounting information tends to be higher in common law countries before the mandatory introduction of IFRS. Also, the results suggest an increase in the value relevance of accounting information after

IFRS adoption in all countries with the exception of Germany and Italy characterised by low level of shareholder protection.

Clarkson et al. (2011) assess the changes in the value relevance of accounting information following IFRS adoption for a sample of 3,488 firms in 14 EEA countries and Australia, where countries are divided into two groups, common law and code law countries. Based on the price model, the results show that there has been no improvement in the value relevance for both sub-samples of code law and common law countries. However, country-by-country analysis shows mixed results.

Overall, the studies reviewed about emphasise the importance of considering country-specific factors when studying the value relevance of financial statement information.

A line of research investigates whether the institutional environment characteristics are associated with accounting quality of financial firms. Fonseca and González (2008), for instance, examine the determinants of income smoothing using LLPs for a sample of 3,221 bank-year observations from 40 countries, including both developed and developed countries. LLPs are regressed on previous LLPs, earnings before taxes and LLP, change in total loans, loan-losses allowance, bank capital and GDP in addition to the explanatory variables of interest. The study documents that the level of income smoothing is determined by investor protection (measured by rights of minority shareholders, creditor rights and legal enforcement from La Porta et al. (1998)), disclosure quality, bank regulation and supervision, financial structure and financial development. The analysis shows that lower income smoothing is associated with the strength of investor protection, the quality of accounting disclosure, official and private supervision and restrictions on bank activities. In contrast, a higher level of income smoothing is associated with market orientation and the development of the financial system at country level.

More relevant to this thesis, Anandarajan et al. (2011) study the impact of institutional environment and firm-specific characteristics on the value relevance of accounting information. They use the following country-level measure: the role of transparency, corporate environment, legal environment (as common law or code law), financing environment, economic environment, market competitive environment, accounting standards, bank regulatory and governance environment. The firm-level characteristics are size, risk, non-traditional activities and multinational status. Their study is conducted based on a sample of 813 financial firms from 38 countries from both developed and developing economies over 1993-2004. Anandarajan et al. use the explanatory power as well as the coefficients on the independent variable from value relevance models (where market value is regressed on book value of equity and then on net income and finally on both book value of equity and net income using quarterly data) as a proxy for the extent of value relevance. This proxy then is regressed on different country-level as well as firm-level characteristics. Their results suggest that transparency has a significant impact on the value relevance of both earnings and book value, and on the combined value relevance. Similar results are reported for corporate environment. Book value of equity and net income tend to be more value relevant in common law countries. Another significant impact on value relevance of accounting information is the accounting standards followed. At firm level, the organisational form and risk appear to have the most impact. Furthermore, book value of equity tend to have greater explanatory power for firms in bank-based, code law countries, whereas reported earnings have more explanatory power in common law countries with marked-based economies.

In a more recent study, Curico and Hasan (2015) report differences in the use of LLPs by banks across Eurozone versus non-Eurozone banks. The analysis is mainly carried out for a sample of 491 banks in Europe over the period from 1996 to 2006. The main model is similar to that adopted by the study of Gebhardt and Novotny-Farkas (2011), reviewed above. Overall, the results show

that LLPs reported by banks reflect the changes in the expected quality of loan portfolio. LLPs are used for earnings management purposes for Eurozone banks, but not for non-Eurozone banks. Banks in non-Eurozone use LLPs to convey private information to outsiders, while this is not the case for those in Eurozone. Also, restrictions on bank activities as well as stronger creditors' protection are found to help in reducing income smoothing. In a further analysis, they investigate the banks' behaviour regarding the use of LLPs for a subsample of 195 banks over the financial crisis period. They report some evidence that for banks in Eurozone LLPs become pro-cyclical and are not used for the purpose of income smoothing. In contrast, their counterpart banks in non-Eurozone tend to use LLPs for income smoothing but not for capital management or to signal private information to the market participants.

2.2.4 Value relevance and corporate governance

A large stream of existing accounting research has investigated whether firm-level corporate governance factors has an influence on earnings management behaviour, which is likely to affect other measures of accounting information quality.¹⁸ For instance, Frankel et al. (2002) evaluate whether there is an association between auditor fees and earnings management. After excluding financial firms, the study is conducted based on a sample of 3,074 US firms in 2001. The findings indicate a significant positive relation between non-audit fees and the likelihood of reporting a small earnings surprise. Furthermore, they find that there is a negative association between audit fees and the level of earnings management.

Similarly but focusing on the characteristics of board of directors and audit committee, Klein (2002) examines the relationship between the percentage of independent directors in both the board of directors and the audit committee, on one hand, and the level of earnings management, on the other hand. The chosen sample includes 692 US non-financial firm-year observations from

¹⁸ Marquardt and Wiedman (2004) report that firms with more earnings management are associated with lower value relevance of earnings as well as lower combined value relevance of book value of equity and earnings. Moreover, they find an increase in the value relevance of book value of equity when the value relevance of net income decreases.

the firms listed on the S&P 500 in 1992 and 1993. The result suggests a negative association between audit committee independence and earnings management. In the same line, there is a negative relation between the percentage of independent directors in the board and the level of earnings management. In the same spirit, Xie et al. (2003) find that more independent directors in the board as well as the presence of corporate executives and investment bankers on audit committees are likely to be associated with lower level of earnings management. Furthermore, the analysis shows that the number of both board and audit committee meetings is also associated with a reduced extent of earnings management. They use a sample of 282 US firm-year observations for firms from the S&P 500 index over three years: 1992, 1994 and 1996.

In the Canadian context, Park and Shin (2004) examine the impact of board composition on earnings management behaviour. Using a sample of 539 firm-year observations over 1991-1997, the empirical findings suggest that the higher percentage of non-executive directors does not appear to reduce the level of earnings management. Yet firms with non-executive directors from financial firms (i.e. financially sophisticated directors) are found to engage less in earnings management. Likewise, the board representation of active institutional shareholders tends to be associated with lower earnings management. Therefore, they conclude that the presence of independent directors by itself may not result in lower earnings management. This is particularly true for firms with highly concentrated ownership.

The impact of firm-level corporate governance practices on the value relevance of accounting information is typically investigated focusing on specific financial statement items, such as fair values. Yet there is little evidence from the impact of corporate governance on the valuation of equity book value and earnings. A study by Larcker et al. (2007) investigates the relationship between corporate governance characteristics of a firm and the value relevance of accounting information measured by the explanatory power of the price model. Larcker et al. evaluate the association between the use of a large set of corporate governance factors and various accounting

and economic measures. The study is conducted using a sample of 2,106 US firms, including both financial and non-financial firms, between June 2002 and May 2003. The results report a very mixed set of associations between the governance factors used and different accounting quality measures. In terms of value relevance, the percentage of affiliated directors in the board of directors and audit committee is associated with lower value relevance, while the existence of directors over 70 years old is associated with higher level of value relevance.

In a more recent study focusing on earnings management, Kent et al. (2010) analyses the association between the characteristics of the board of directors and the audit committee, on one hand, and earnings management, on the other. The sample comprises of 392 firm-year observations in Australia over 2001-2005, and the corporate governance data is based on 2004 annual reports. The corporate governance variables include the percentage of independent directors serving on the board of directors, Chief Executive Officer duality, and the percentage of independent directors in the audit committee, the number of audit committee meetings and the proportion of audit committee members with professional accounting qualifications. The results show that strong corporate governance is associated with higher quality earnings.

Finally, in a study relevant to this thesis, Verriest et al. (2013) examine the association between first time IFRS adoption quality and disclosure, on one hand, and corporate governance strength, on the other. The study uses a sample of 223 European firms, 71 of which are financial firms, located in 15 countries (14 EEA countries and Switzerland) and adopted IFRS in 2005 for the first time. The first time IFRS adoption properties are measured in three ways. Firstly, it is measured by companies' transparency regarding the reconciliations from local GAAP to IFRS. Then it is measured by the amount and type of information firms provide in their financial reports with respect to specific IFRS, including IAS 39. Finally, it is represented by the flexibility exercised in early adopting versus postponing the adoption of IAS 39. The corporate governance data are drawn from the Risk Metrics corporate database. In a further analysis, Verriest et al.

emphasise three specific corporate governance characteristics at firm-level derived from the same database: the functioning of the board of directors, the independence of the board of directors and the effectiveness of the audit committee. By regressing IFRS adoption quality and disclosure measures on corporate governance factors, they found that firms characterised by stronger corporate governance mechanisms seem to provide more transparent reconciliation information. In addition, the strong corporate governance results in more extensive information disclosure on both mandatory and voluntary adoption items. Regarding IAS39 adoption, the results show that firms tend to be opportunistic in adopting that standard: they appear to postpone the adoption when there is bad news. Again, strong corporate governance results in early adoption of IAS 39 in the case of bad news. Furthermore, firms with more board independence and effective audit committee appear to provide higher quality accounting information.

2.2.5 Discussion and summary on the impact of IFRS and the crisis on value relevance

Value relevance is considered as the ability of accounting information to capture or summarise information, regardless of source, that has an effect on market value of equity (Francis and Schipper, 1999). Operationally, the value relevance is measured by the statistical association between market value of equity and accounting information (Barth et al., 2001). Previous studies find evidence that differences in accounting practice can cause differences in the value relevance of financial statement to investors both at the national and international level (see, e.g., Dobija and Klimczak, 2010; Barth et al., 2008).

Accordingly, the accounting literature investigates the impact of mandatory IFRS adoption on accounting information quality through the changes in the explanatory power of the value relevance models. In a single country context, some of these studies report an increase in the value relevance of accounting information following the mandatory introduction of IFRS, for instance, Filip (2010) in Romania and Liu et al. (2011) in China. Other studies show empirical findings of little increase or no significant changes in the value relevance. Example of these

studies are Gjerde et al. (2008) in Norway, Paananen (2008) in Sweden, Dobija and Klimczak (2010) in Poland, Chalmers et al. (2011) in Australia, and Karampinis and Hevas (2011) as well as Tsalavoutas et al. (2012) in Greece. Interestingly, Morais and Curto (2008) document a decrease in the value relevance after IFRS adoption in Portugal. Oliveira et al. (2010) report a decrease in the value relevance of earnings compared to no effect on that of equity book value following the implementation of IFRS by Portuguese firms in 2005.

This suggests that many factors may affect the quality of accounting information rather than accounting standards such as incentives, enforcement, and ownership structure (Ball, 2006; Holthausen, 2009). The studies reviewed above are conducted using a single country sample, allowing them to control for internationally different and confounding factors. This in turn enhances the power of the test and improves the reliability of their findings. However, the results of a single country study are less generalisable to other countries context. In this thesis, the relatively small number of financial firms in many of the countries under study does not offer sufficient number of observations to conduct single country studies.

Moving to multi-country studies, Devalle et al. (2010) provide evidence that there has been an increase in the value relevance after IFRS adoption in 2005 for firms listed on five European stock exchanges. However, the empirical findings by Aubert and Grudnitski (2011) indicate an insignificant change in the value relevance of accounting information when it is prepared in accordance with IFRS rather than domestic accounting standards based on a large sample of listed firms in 14 EEA countries and Switzerland. Similarly, Clarkson et al. (2011) report no improvements in the value relevance following IFRS adoption using a sample of 3,488 firms in 14 EEA countries and Australia.

Previous research provides mixed evidence regarding the impact of IFRS adoption on the value relevance in both single and multi-country studies. Notably, most of them include firms from a

wide spectrum of industries in their selected samples (e.g. Gjerde et al., 2008; Devalle et al., 2010; Aubert and Grudnitski, 2011; Chalmers et al., 2011), which might explain some of these ambiguous results, as observed by Anandarajan et al. (2011). In addition, many previous studies exclude financial firms from their sample due to their distinct characteristics, such as Oliveira et al. (2010), Liu et al. (2011) and Tsalavoutas et al. (2012). Taken together, this motivates this thesis to shed the light on the impact of IFRS adoption on a single industry, namely financial firms.

A stream of accounting studies investigates the use of loan loss provisions (LLPs) under IFRS regime (i.e. IAS 39) compared to the local accounting standard. Gebhardt and Novotny-Farkas (2011) and Leventis et al. (2011) report a decline in the use of LLPs as a tool of earnings management of European banks following the mandatory introduction of IFRS in 2005. Reviewing the literature shows few studies that exclusively focus on financial firms in investigating the impact of IFRS adoption on the overall value relevance of book value of equity and earnings. Based on the early years of adoption, a study by Agostino et al. (2011) suggests an increase in the overall value relevance of financial statement information following IFRS adoption for a sample of financial firms in the EEA. Moreover, they find that the value relevance of earnings increases following IFRS, whereas for equity book value the results are less clear-cut. Consistently, a more recent study by Manganaris et al. (2015) using a longer time horizon reports an increase in the value relevance of earnings in comparison to a decrease on that of book value of equity after IFRS adoption by a sample of financial firms in the EEA. While their results suggest a shift in the value relevance of equity book value and net income with IFRS adoption, Manganaris et al. have not tested the changes in the overall value relevance of book value of equity and earnings as a result of IFRS adoption, which is the focus of this study.

This research contributes to the existing literature by extending the study period to cover eight years after IFRS adoption rather the early years of adoption, as for example in Agostino et al.

(2011). The change in the quality of accounting information as a result of IFRS adoption might be more noticeable in the medium to long-term rather than in the earlier years of adoption (Callao et al., 2007; Kvall and Nobes, 2010; Kvall and Nobes, 2012; Houqe et al., 2012). Also, it might be interesting to evaluate whether there has been any change in the value relevance of financial statement information during the most recent financial crisis. Hence, this thesis further investigates the influence of the financial crisis on two summary measures of financial statements: book value of equity and earnings.

The financial crisis is expected to have an impact on the value relevance of accounting information; an early study by Barth et al. (1998a) finds that the valuation coefficient of equity book value increases over the period of five years preceding bankruptcy, while that of net income tends to decrease over the same period for a sample of US firms. Graham et al. (2000) document that whereas the incremental value relevance of equity book value increases, that of net income decreases following the Asian financial crisis for a sample of listed firms in Thailand. In a multi-country context, Davis-Friday et al. (2006) report that the effect of financial crisis on the value relevance of equity book value and earnings varies across Asian countries.

A branch of studies questions whether the financial crisis affects the value relevance of specific items in the balance sheet and income statement. Fen et al. (2010), for instance, document a significant decrease in the value relevance of net income components, while the results for book value components are less clear-cut and vary across industries in Taiwan. In the same line, Choi et al. (2011) provide empirical findings that there is a significant decline in the value relevance of discretionary accruals but no significant change in that of non-discretionary earnings components for a sample from nine Asian countries.

Filip and Raffournier (2012) show a decrease in earnings management during the financial crisis using a sample of listed firms in 16 European countries in the EEA and Switzerland. However,

Iatridis and Dimitras (2013) document that the effect of financial crisis on the accounting information quality, measured by earnings management and value relevance, varies across five European countries. Focusing on financial firms, Cohen et al. (2014) shows that US banks showing earnings management behaviour before a financial crisis are more likely to experience downside risk during a crisis period. However, the study of Beccalli et al. (2015) finds that banks in Europe tend to engage in earnings management activities via LLPs before the crisis but not in the crisis period. Examining the accounting discretion in terms of write-downs, Vyas (2011) report that write-downs of assets by US financial firms tend to be less timely than a benchmark developed using the devaluation implied by credit indices.

The value relevance of equity book value and earnings might vary across countries owing to the differences in their legal and institutional environment. A long line of accounting research classifies an accounting system based on the origin of the legal system in its home country into common law versus code law systems (e.g. Joos and Lang, 1994; Leuz et. al., 2003; Barth et al., 2012). This common versus code law distinction is based on the view that the purpose of accounting standards in the former is to satisfy the information needs of existing and potential investors, while in the later to provide information mainly for taxation purposes. Consistent with this argument, Black and White (2003) report a variation in the value relevance of equity book value and net income across three countries, namely, Germany, Japan and the US in 1997.

A number of previous studies classifies countries into common law and code law in investigating the value relevance of accounting information. An example is the literature on the impact of IFRS adoption on the quality of accounting information. Since IFRS have been largely developed in common law countries, it is expected that IFRS adoption to have more significant impact on the financial reporting in code law countries (Bartov et al., 2005, Armstrong et al., 2010; Barth et al., 2014). Prather-Kinsey et al. (2008) document results in line with this expectation for a sample of European firms. Lourenço and Curto (2008) report an increase in the value relevance of

accounting information after IFRS adoption in European countries with the exception of Germany and Italy characterised by low level of shareholder protection. However, the results of Clarkson et al. (2011) suggest no improvement in the value relevance for both sub-samples of code law and common law countries.

A line of research investigates whether the institutional environment characteristics are associated with accounting quality of financial firms. For example, Fonseca and González (2008) find that earnings smoothing activities using LLPs are associated with investor protection, disclosure quality, bank regulation and supervision, financial structure and financial development. More relevant to this thesis, Anandarajan et al. (2011) use a sample of 813 financial intermediaries from 38 countries over the period 1993-2004. They find that institutional environment and firm-specific characteristics have an impact on the value relevance of accounting information. In a recent study, Curico and Hasan (2015) report differences in the use of LLPs by banks across Eurozone versus non-Eurozone banks. Interestingly, they find that for Eurozone banks LLPs become pro-cyclical and are not used for the purpose of income smoothing during the financial crisis. In contrast, LLPs are used for income smoothing but not for capital management or to signal private information to outsiders in the crisis period for banks in non-Eurozone.

As with institutional factors, corporate governance practices are expected to have an influence on the value relevance of book value of equity and net income surrounding financial crisis. In fact, a large stream of previous accounting research examines whether firm-level corporate governance factors have an impact on accounting information quality, with special emphasis on earnings management.¹⁹ For instance, Frankel et al. (2002) find a negative association between audit fees and the level of earnings management. In the same context, Klein (2002) reports a negative association between the percentage of independent directors in both board of directors

¹⁹ Marquardt and Wiedman (2004) find an association between the level of earnings management and the value relevance of accounting information.

and audit committee and the level of earnings management. Xie et al. (2003) document that more independent directors in the board as well as the presence of corporate executives and investment bankers on audit committees are likely to be associated with lower level of earnings management. However, for a sample of Canadian firms, Park and Shin (2004) find that the presence of independent directors by itself may not result in lower earnings management, and that is particularly true for firms with highly concentrated ownership. A more recent study by Kent et al. (2010) in Australian context suggests that strong corporate governance mechanisms are associated with higher quality accruals.

The literature typically investigates the impact of firm-level corporate governance mechanisms on the value relevance of specific financial statement items, such as fair values; yet there is little research that addresses the impact on the valuation of equity book value and earnings.

A study by Larcker et al. (2007) investigates the relationship between corporate governance mechanisms and the value relevance of accounting information, measured by the explanatory power of the price model. In their study, the affiliated positions of director in the board of directors and audit committee are found to be associated with lower value relevance, while the existence of old directors is associated with higher level of value relevance.

Verriest et al. (2013) document that firms characterised by stronger corporate governance seem to provide more transparent IFRS restatements in the first year of IFRS adoption. Also, the results show that firms tend to be opportunistic in adopting IAS 39: they appear to postpone the adoption when there is bad news. Again, strong corporate governance results in early adoption of IAS 39 in case of bad news. In terms of accounting discretion in the timing of write-downs, Vyas (2011) finds that financial firms with strong corporate governance report more timely write downs of assets during the financial crisis.

PART II

2.3 Literature review on value relevance of fair value hierarchy

2.3.1 Fair value studies before SFAS No. 157 and IFRS 7

2.3.1.1 US literature

Over the last three decades, the Financial Accounting Standards Board (FASB) has issued and developed several accounting standards²⁰ to expand the use of fair value measurements and enhance the disclosure about fair value estimates. The majority of these standards address financial assets and liabilities (financial instruments) that are widely held by financial firms. The accounting literature investigates whether disclosed fair value estimates provide investors with incremental value relevant information relative to the book value of financial instruments based on historical cost (amortised cost). Early studies investigate the voluntary disclosure of fair value estimates of investment securities (prior to the mandatory disclosure in accordance with SFAS No. 107 effective in 1992). For example, Barth (1994) examines whether the disclosed fair value estimates as well as fair value gains and losses, in comparison to historical cost, of banks' investment securities are reflected in the market value of equity. Over the period from 1971 to 1990 and for a sample of 100 US banks, equity market value is regressed on the book value of equity (decomposed into book value of equity before investment securities and historical cost of investment securities) and the disclosed fair value of investment securities. Similarly, stock returns are regressed on the change in net income (before investment securities), securities gains and losses based on historical costs and unrecognised fair value securities gains and losses. The results suggest that fair value estimates of investment securities are positively associated with equity market value. For fair value gains and losses of securities, the results are mixed. This might be because of the measurement errors associated with the estimates of fair value gains and losses. Another explanation could be the correlated unrecognised gains and losses which could have

²⁰Namely, SFAS No. 105, SFAS No. 107, SFAS No. 115, SFAS No. 119, and SFAS No. 133.

hedged the fair value gains and losses for investment securities. Another study by Barth et al. (1995) uses the same time period to confirm the impact of measurement errors in the analysis when it reports that fair value components of net income are more volatile than the part of historical cost, and stock price does not reflect this incremental volatility. Interestingly, Ahmed and Takeda (1995) support the view of omitted correlated gains and losses of other net assets. Using the same model for a sample of 3,276 bank quarterly observations over the period 1986-1991, they control for the effects of other (on-balance sheet) net assets due to changes in interest rate. The results reveal a significant and positive association between unrecognised gains and losses and firm's share return.

Effective since 1992, FASB issued SFAS No. 107 *Disclosures about Fair Value of Financial Instruments* which requires the mandatory disclosure of fair value estimates for all financial assets and liabilities, whether on- or off-balance sheet. Three studies examine the decision usefulness of fair value disclosure based on this standard, namely, Nelson (1996), Eccher et al. (1996) and Barth et al. (1996). In particular, the value relevance is evaluated separately for five groups of financial assets and liabilities: loans, investment securities, long-term debt, deposits and off-balance sheet items.

Starting with Nelson (1996), she examines the fair value disclosure based on SFAS No. 107. In the first model, the market value of equity is regressed on book value of equity plus the difference between fair value estimates and book value of investment securities, net loans, deposits and long-term debt as well as off balance sheet financial instruments. In the second model, the stock return is regressed on the changes (gains and losses) in the fair value estimates. Based on a sample of 146 (133) US banks in 1992 (1993), the findings of the study suggest that only the fair value of investment securities contains value relevant information to investors.²¹

²¹ When other control variables for future profitability, namely return on equity and growth in book value are included, the fair value estimates of investment securities become value irrelevant.

In a similar study, Eccher et al. (1996) find that the fair value of investment securities are value relevant for a sample of around 300 US bank holding companies in 1992-1993. They use a model where the market value of equity is regressed against the difference between disclosed fair values and book values of available for sale and trading securities, investment securities, net loans, deposits, long-term debt as well as the fair value of off balance sheet items. Furthermore, the fair value estimates of some financial instruments provide value relevant information in limited settings. Specifically, the fair value estimates of net loans have a weaker association with equity market value in comparison to the fair value of securities, and their valuation coefficient are significant only in limited settings. The off balance sheet items are also value relevant in limited settings. Finally, the fair values of deposits are not value relevant.

In comparison to Nelson (1996) and Eccher et al. (1996), Barth et al. (1996) find that the fair value estimates of net loans are value relevant to their recognised book values. In terms of methodological settings, they use a more powerful research design. More control variables are included in their model to account for the factors that might affect the value relevance of fair value disclosure, including non-performing loans, as well as interest-sensitive assets and liabilities. The market value of equity is regressed on the difference between the fair value disclosures based on SFAS No. 107 (for investment securities, loans, deposit, long-term debt and off balance sheet instruments) and reported book values. They also include in their model two groups of control variables, namely variables related to non-SFAS No. 107 assets and liabilities and variables that are potential competitors to SFAS No. 107 variables. Similarly to Nelson and Eccher et al., the sample consists of 136 US banks over two years: 1992 and 1993. The findings suggest that the fair value disclosures of investment securities, loans and long-term debt are value relevant to investors, but this is not the case for deposits and off-balance sheet items. Interestingly, the study reports that investors tend to discount the fair value estimates of loans for less

financially healthy banks. This can be explained by the incentive for managers of less financially healthy banks to overstate (understate) unrealised gains (losses).

In sum, the reviewed studies show that the disclosed fair values of investment securities for financial firms, including banks, are typically found to be value relevant to investors. Investment securities tend to have quoted prices in active markets. However, the results regarding the other items are inconclusive. In relation to net loans numbers, which are largely based on estimates with absence of established markets, Nelson (1996) reports that estimated fair values of loans are not value relevant, while Eccher et al. (1996) show that these fair value estimates are value relevant in limited settings. Barth et al. (1996) document value relevant fair values of loans after including more control variables in the model. These mixed results about the fair values of loans raise concerns regarding the reliability of fair value estimates when active markets do not exist for the financial instruments.

Another branch of fair value accounting literature examines the value relevance of expanded fair value disclosure on derivatives based on SFAS No. 119 *Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments* using samples of US financial firms. The disclosed fair value of derivatives is considered value relevant to investors if it has a significant association with market value of equity (after controlling for fair values of the primary on-balance sheet numbers). Venkatachalam (1996), for instance, examines the value relevance of fair value disclosures of derivatives as off-balance sheet items. The study is conducted based on a sample of 99 US bank holding companies that used off-balance sheet financial derivatives over the two years 1993 and 1994. The results show that the fair value disclosures for derivatives explain the cross-sectional variation in the market value of equity for the sample of banks under investigation. Put differently, they provide value relevant information to investors.

Using a different model specification, Seow and Tam (2002) examine the disclosed fair value of derivatives based on SFAS No. 107 and SFAS No.119. Their model is based on a regression of share price returns on reported earnings in addition to variables for the recognised and disclosed amounts of derivatives. The sample comprises of 106 US firm-year observations over the period 1990-1996. Regarding the fair value disclosure on derivatives, the empirical findings indicate that the disclosure is value relevant to investors as it is significantly associated with stock returns.

Focusing on mutual funds, Carroll et al. (2003) evaluate the value relevance of fair value investment securities relative to historical cost. Using a sample of 143 US closed-end mutual funds over the period 1982-1997, they run a regression of market value of equity on book value of equity (other than investment securities) and fair value of investment securities in addition to their book values. Similarly, the stock returns are regressed on the fair value securities gains and losses after controlling for historical cost amounts in the changes specification. The results report a significant and positive association between market value of equity (stock return) and the fair value of investment securities (fair value securities gains and losses). In a further analysis, the authors examine whether the degree of association varies across different fund types. They find that even for investment securities traded in thin markets, the fair value provides value relevant information to investors.

In a more recent study with a sample including data for the period of fair value recognition of derivatives based on SFAS No. 133 *Accounting for Derivative Instruments and Hedging Activities* (where their fair values are disclosed before the adoption date), Ahmed et al. (2006) find that only the recognition, but not the disclosure, of derivative fair values provide value relevant information to investors. The study is conducted based on a sample of 146 US banks over the period 1995-2000. The specification adopted is the regression of market value of equity on the recognised and disclosed fair values of derivatives and the recognised values of other assets and liabilities in the balance sheet, in addition to a set of control variables (namely non-

performing loans and domestic deposits minus time deposits). The analysis shows that the valuation coefficients on the recognised derivatives are significantly positive, whereas the corresponding coefficients on the disclosed derivatives are not statistically different from zero. As such, the study supports the view that the accounting information disclosure and recognition are not substitutes.

Again, the reviewed studies show that the disclosed and recognised fair values of derivatives provide useful information to investors for valuation purposes. These findings contrast with previous studies showing that the disclosed fair values of off-balance sheet items are not value relevant (Nelson, 1996; Eccher et al., 1996; Barth et al., 1996), which might be attributed to ambiguities in the fair value disclosures before SFAS No. 119 and SFAS No. 133. In addition, even for those traded in thin markets, Carroll et al. (2003) find that the fair values of investment securities provide value relevant information to investors.

2.3.1.2 Non –US studies

Fewer studies have investigated the relevance of fair value information to investors in a non-US context. An early study by Bernard et al. (1995) analyses the mark-to-market accounting practices in Denmark, where bank regulators have required banks' regulatory capital to be measured using mark-to-market for a long period of time. In particular, the study examines the reliability of mark-to-market accounting for loan loss provisions and price adjustments on investments and some off-balance sheet items. The variables under study are regressed on their lagged values, so correlated values over time are considered as a sign of accounting manipulation. The sample includes 1,035 Danish bank-year observations over the period from 1976 to 1989. The empirical findings reveal some evidence of manipulating loan loss provisions, but not for price adjustments of investments and off-balance sheet items. However, no evidence of using mark-to-market accounting to manipulate regulatory capital reported. Interestingly, in a further analysis Bernard et al. compare the mark-to-market net assets and market value of equity in two countries,

Denmark and the US as US banks did not use mark-to-market over their study period. The results suggest that, in comparison to the US, the mark-to-market net assets reported by Danish banks are more reliable estimates of market value of equity.

The mandatory adoption of fair value-oriented accounting standards (i.e. IFRS) since 2005 in Europe allows accounting scholars to evaluate the impact of fair value accounting in a multi-country setting. For example, Drago et al. (2013) evaluate whether the fair value estimates of banks' loans provide incremental value relevant information relative to their book values (based on amortised cost). Using a sample of 83 listed banks in EEA countries between 2005 and 2008, the market value of equity is regressed on: the book value of equity, reported net income, the difference between book value and estimated fair value of loans, and a set of control variables (dummy variables for bank size, ownership, the financial crisis and country). The results indicate that the valuation coefficient on the difference between the book values and fair value estimates of loans is negative and statistically significant. In other words, the estimated fair values of loans disclosed in the footnotes of European banks are incrementally useful to investors beyond the book values of loans measured under amortised cost.

A working paper by Fiechter and Novotny-Farkas (2014) examines the value relevance of three categories of financial instruments recognised at fair value in accordance with IAS 39, namely: held for trading, those that were designated at initial recognition at fair value through profit or loss, and available for sale. The authors argue that, compared to the other categories, financial assets and liabilities designated at initial recognition at fair value through profit or loss are considered less reliable given that they are more subject to managerial discretion and measurement error due to greater use of unobservable valuation inputs. Also, Fiechter and Novotny-Farkas investigate how country-level characteristics might affect the value relevance of the three categories of financial instruments. Their study uses a sample of nearly 1,000 bank-year observations for listed firms in 50 countries over the period 2006-2009. The model adopted is the

regression of market value of equity on the three categories of financial instruments under study after controlling for other financial statement information. The countries are classified into two categories, market-based and bank-based; and banks are divided based on their information environment.²² The empirical findings reveal lower value relevant financial instruments designated at initial recognition at fair value compared to those held to maturity. Bank-based countries are found to be associated with lower value relevance of fair values, which might be explained by lower enforcement level and higher measurement errors (or bias). Finally, the results indicate that firms characterised by high quality information environment have higher value relevant financial instruments designated at initial recognition at fair value through profit or loss. Focusing on the first year of IFRS adoption for a sample of listed firms in 14 EEA countries and Switzerland, Barth et al. (2014) examine the value relevance of the net income reconciliations from local GAPP to IFRS for both financial and non-financial firms (276 and 925, respectively). The findings reveal a significant positive valuation coefficient on the reconciliations from GAAP to IFRS for both types of firms suggesting that the disclosed reconciliations are value relevant. Interestingly, the findings indicate that reconciliations related to IAS 39 are value relevant only for financial firms but not for non-financial firms.

Overall, in line with US studies, the main non-US literature indicates incremental value relevance information provided by fair value disclosure and recognition of financial assets and liabilities; and the value relevance of fair value measures tends to vary with the reliability of fair value information. Moreover, both country-level as well as firm-level characteristics seem to play a role in determining the value relevance of fair value estimates.

²²A bank has a strong information environment if it has both above median analysts following and above median market value of equity weighted by the percentage share of dispersed ownership.

2.3.2 Literature review on fair value hierarchy

2.3.2.1 Literature review on SFAS No. 157

The US accounting standard setter, FASB, issued Statement of Financial Accounting Standards No. 157, *Fair Value Measurements* in 2006 (FASB 2006), effective for fiscal year starting after 15 November 2007. In particular, SFAS No. 157 requires firms to disclose fair value assets and liabilities by levels that reflect the valuation inputs used to estimate fair values: level 1 is measured using quoted prices for identical instruments traded in active market, level 2 is measured based on observable market inputs other than those used in level 1 (e.g. quoted price for comparable financial instruments), and level 3 is estimated using non-observable inputs (mark-to-model). This accounting standard provides an opportunity to investigate whether the value relevance of fair value measures varies with the reliability of the information.

Three recent studies examine the value relevance of fair value hierarchy under SFAS No. 157: Kolev (2009), Song et al. (2010) and Goh et al. (2015). In all of these US studies, the market value of equity is regressed on the three levels of fair values after controlling for other non-fair value financial statement information (i.e. non-fair value net assets as well as net income). The value relevance of a fair value level is measured by the valuation coefficient on that level.

Starting with Kolev (2009), he evaluates the differences in the value relevance of fair value levels disclosed under SFAS No. 157. The study is conducted using a sample of 349 US financial firm-year observations over the first two quarters of 2008. The analysis indicates that the valuation coefficients on fair value at level 2 and 3 are lower than the corresponding coefficient on level 1 fair values; however, the difference is significant only for level 3 fair values. Moreover, the study shows lower valuation coefficients on level 2 and 3 fair values for firms characterised by having fewer financial experts on the audit committee and lower equity capital, as well as for those internally estimating their mark-to-model fair values.

Song et al. (2010) conduct a similar analysis to the valuation coefficients on the three levels of fair values for a sample of 1,260 US financial firm-year observations over the first three quarters of 2008. The empirical findings report higher value relevant level 1 and 2 fair value measures in comparison to those at level 3. Also, they find no significant difference between the valuation coefficients on fair values at level 1 and level 2. Furthermore, they evaluate the impact of firm-level corporate governance mechanisms on the value relevance of fair values. In particular, six measures of corporate governance are used, namely the percentage of independent directors in the board of directors, the percentage of financial expertise serving in the audit committee, the number of audit committee meetings, the total percent of share held by institutional investors, the size of audit engagement office and whether there is a material control weaknesses problem based on Sarbanes-Oxley Act 302 or 404. The results support the view that strong corporate governance mechanisms can mitigate the information asymmetry problems associated with fair values classified at level 3. This, in turn, increases the reliability and the value relevance of level 3 fair values.

Over a longer time span, Goh et al. (2015) investigate the value relevance of the three levels of fair value under SFAS No. 157. The study covers the period from 2008 to 2011 for a sample of 6,893 firm-quarter observations for financial firms listed on the US stock markets. The empirical results show that the coefficient on level 3 fair values is significantly lower than those on level 1 and 2. Moreover, the differences between the valuation coefficients tend to reduce over time (i.e. when market conditions improve), concluding that there is a greater concern about the liquidity and information risk of level 3 fair value measures during the financial crisis. Finally, incorporating banks capitalisation levels in the model show that lower capital adequacy ratios are associated with lower value relevance of level 1 and level 2 fair values.

Some of marginal differences between the results of three studies reviewed above on the value relevance of fair value hierarchy under SFAS No. 157 might be attributed to the different samples

and time periods as well as some differences in the models employed (i.e. using net fair value assets rather than fair value assets and liabilities separately).

Managers might use their discretion over accounting choices to engage in earnings management activities such as big bath accounting,²³ and hence affect the quality of financial statement information. Consistent with this view, Fiechter, and Meyer (2010) find that managers tend to exercise the discretion inherent in level 3 fair values for the purpose of big bath accounting in times of financial crisis. Their study is conducted using a sample of 552 U.S. bank holding companies over the period from the first quarter of 2008 to the first quarter of 2009. They estimate first the nondiscretionary level 3 gains or losses by the regression of the sum of net unrealised gains or losses on recurring level 3 positions plus non-recurring gains or losses on a set of determinants²⁴ of changes in level 3 fair values. The residuals are considered as the discretionary level 3 gains or losses. Then the sample is divided based on the firms' performance (using net income numbers). The results show that poor pre-managed performance banks seem to report higher level of discretionary level 3 losses. In the subsequent period, these banks tend to switch from non-managed negative earnings to reported positive earnings (i.e. evidence of big bath accounting).

Another branch of accounting literature sheds some light on the economic consequences and information risk of fair value accounting information. In this context, and focusing on the cost of capital, Riedl and Serafeim (2011) investigate whether level 3 fair value assets are associated with greater information risk and, hence, higher cost of capital, in comparison to level 1 and 2 fair values. The information risk for each fair value level is estimated by asset-specific implied betas (cost of capital). The sample comprises 952 US financial firm-quarter observations from

²³ Big bath accounting is when managers under-report earnings (overstate losses) in bad times, in order to report higher earnings in the future and hence increase their bonuses (Healy, 1985).

²⁴ The determinants are: level 3 net assets, market to book ratio, relative rank of total assets, debt to assets ratio, loan loss provisions before gains or losses on level 3, non-interest income before gains or losses on level 3, and time and sub-industry fixed effect.

the second quarter of 2007 to the second quarter of 2008. The findings indicate that the estimated betas for level 3 fair values are significantly higher than those for either level 1 or 2 fair values, implying a higher cost of capital related to level 3 fair values. In an additional analysis, the main sample is partitioned into firms with higher-quality information as opposed to lower-quality information environments based on four proxies.²⁵ They find that firms' information environment plays a critical role in decreasing the differences in information risk across the levels of fair value hierarchy.

Another study by Liao et al. (2013) investigates the association between the three levels of fair value hierarchy based on SFAS No. 157 and information asymmetry. They use bid-ask spread as a proxy for information asymmetry for a sample of 2,856 US bank-quarter observations spanning through Quarter 1 2008 to Quarter 4 2009. The bid-ask spread²⁶ is regressed on the three levels of fair values with a set of control variables. The results show a positive association between bid-ask spread and fair value net assets, and the extent of the association varies across the three levels of fair value hierarchy. In particular, the association is found to be the lowest for fair values classified at level 1 and the highest for those at level 3. Also, they report a decrease in bid-ask spread after SFAS No. 157 adoption. In sum, the study reveals that the disclosure of fair values hierarchy provides investor with useful information, but information uncertainty varies with the three levels of fair value.

Similarly, Huang et al. (2015) examine the association between cost of equity capital²⁷ and the three levels of fair value. The model specification is the regression of cost of capital on the three levels of fair value in addition to a set of control variables for a sample of 814 US financial firm-

²⁵ The four proxies are: analyst following, market capitalisation, analyst forecast error, and analyst forecast dispersion.

²⁶ This is calculated as the difference between the daily closing ask price and the daily closing bid price divided by the average value of the daily bid and the ask price.

²⁷ The cost of capital is calculated using four proxies: (1) price-earnings growth as developed by Easton (2004); (2) the abnormal earnings growth by Gode and Mohanram (2003); (3) the modified Ohlson and Juettner-Nauroth (2005) and (4) Claus and Thomas's (2001) method.

year observations over the two financial years 2008 and 2009. The findings show that firms' cost of capital tends to be positively associated with less verifiable fair value assets (i.e. level 3 fair values). Furthermore, the relation between cost of capital and the three levels of fair value is investigated as a function of firm-level corporate governance. They use a corporate governance score based on the principle component analysis of four variables: the percentage of independent directors on the board, the number of audit committee members with financial expertise, auditor industry specialisation and whether there is internal control material weakness. The study reports that the positive association between level 3 fair values and cost of capital tend to be lower for firms with strong corporate governance mechanisms.

To sum up, previous studies in the US context have shown that the valuation coefficient on less reliable fair values (level 3) is lower than that on fair value at level 1. In other words, level 3 fair values, based on inputs other than market prices, is less value relevant to investors than level 1 fair values, based on market observable inputs. Furthermore, it is also found that information asymmetry and cost of capital are higher for level 3 fair values. This empirical evidence supports the view that the fair value hierarchy disclosure under SFAS 157 provides investors in US financial firms with useful information for valuation purposes.

2.3.2.2 Literature review on IFRS 7

IASB issued IFRS 7 *Financial Instruments: Disclosures* in August 2005 to replace IAS 30 *Disclosures in the Financial Statements of Banks and Similar Financial Institutions*. IFRS 7 is mandated for fiscal years starting on or after 1 January 2007 with the aim of revising and enhancing the disclosures about financial instruments. In specific, the main objective of IFRS 7 is to enhance information disclosure to help information users in evaluating the significance of financial instruments to the firms' financial position and performance. Furthermore, it aims to provide disclosure on the nature and extent risks associated with financial instruments and how they have been managed by the reporting entities (IASB, 2009a). The disclosure requirements

under IFRS 7 are divided into two distinctive sections. In the first section it considers the financial assets and liabilities reported in the balance sheet and income statement. The second section covers the area of risk disclosure and how firms manage the risks arising from financial instruments. With a clear intention of improving the disclosure about financial instruments, IASB has amended IFRS 7 several times since 2005.

In 2009, IASB issued amendments to IFRS 7 requiring more disclosure on the fair value amounts. In line with the Statement of Financial Accounting Standards (SFAS) No 157 issued by Financial Accounting Standards Board (FASB) in the US, the new amendments require that reporting firms to classify their fair value measurements into hierarchy, reflecting the significance of the valuation inputs used in determining the measurements. The fair value hierarchy includes the following three levels:

Level 1: fair values measured based on quoted prices in an active market for identical assets or liabilities;

Level 2 : fair values measured based on inputs other than quoted prices included in level 1 that are observable for financial assets and liabilities, either directly (i.e. direct prices for identical instruments traded in inactive market), or indirectly (when it is derived from quoted prices of similar instruments in active markets); and

Level 3: fair values measured based on unobservable inputs (i.e. internally generated inputs) (IASB, 2009b).

IASB considers enhancing the disclosure on financial instruments via fair value hierarchy as a response to the financial crisis, especially for financial instruments that are not traded in active markets (IASB, 2009a). Given that the new disclosure requirements provide information on the relative reliability of fair value amounts reported by firms, it is more likely to increase the comparability between reporting firms regarding their fair value measurements. Furthermore,

these requirements are one step toward more convergence between IFRS and the US GAAP. This, in turn, would increase the comparability between firms reporting under the two regimes. The disclosure about fair value hierarchy is required for fiscal years beginning on or after 1 January 2009. In 2011, the requirements of fair value hierarchy disclosure were transferred from IFRS 7 to IFRS 13 with more detailed guidance, especially for level 3 fair values. IFRS 13 is mandatory for fiscal years beginning on or after 1 January 2013. Given that the present analysis covers the period up to the end of fiscal years beginning on or after 1 January 2012, the fair value hierarchy disclosure for financial firms under study is disclosed under IFRS 7.

There is scant evidence on the changes in the accounting information quality as a result of the enhanced disclosure requirements under IFRS 7. As far as I am aware, there is only one study by Bischof (2009) that examines whether there has been any improvement in disclosure quality after the mandatory adoption of IFRS 7. Based on a sample of 171 banks operating in 28 European countries (the EEA and Switzerland) for the first year of mandatory adoption (2007), the author measured disclosure quality both quantitatively, using the length of financial statements as well as risk reports, and qualitatively via the content analysis of these reports. The analysis indicates that there has been an improvement in the disclosure quality in both financial statements and in risk reports; however, the focus of disclosures has shifted from market risk exposures to credit risk exposures. More relevant to the present thesis, the results suggest a variation in disclosure quality between European countries. They explain that by looking at the differences in the enforcement level as well as the interpretation of IFRS 7 across the countries under study.

2.3.3 Institutional environment, corporate governance and fair value

Opponents of fair value accounting question its reliability because of the associated information asymmetry problems and measurement errors. The reliability concerns are particularly true for assets and liabilities with no established active markets. In such cases, it can be difficult to disentangle the fair value of asset or liability from its value-in-use to the entity (Landsman, 2007).

An example can be the estimated fair value of a swap derivative not traded in active market, which is more likely to be associated with the other assets and liabilities in the balance sheet of a financial firm. With the absence of an active market, managers use less verifiable inputs to estimate the fair value of financial instruments (and the changes in their fair values). These estimates therefore can be subject to measurement bias. Similarly for these instruments, managers use considerable judgment to estimate their fair values, making them susceptible to a relatively high level of measurement error. As such, it has been argued that estimating fair values for financial assets and liabilities, for which active markets do not exist, can introduce bias or/and noise, which in turn leads to lower accounting information quality (Landsman, 2007; Penman, 2007). In this line, a stream of accounting literature studies the impact of managerial opportunism on the reliability and relevance of fair value estimates.

Beaver and Venkatachalam (2003), for example, investigate the valuation coefficients on the different components of loan fair values. Particularly, the disclosed fair values of loans are disaggregated into non-discretionary, discretionary, and noise components. In their model, the fair values of loan is regressed on proxies for discretionary and non-discretionary factors. To identify the nondiscretionary component they use loan losses, nonperforming loans, and interest gap. One-year-ahead future net income and regulatory capital ratio are used to proxy for the discretionary component, as the former is a proxy for the signalling and the latter is for opportunistic discretion. Finally, the residuals reflect noise, which might be due to measurement error and/or “unmodelled” factors of disclosed fair values of loans. The main model is the regression of market values of equity on the components of loan fair values after controlling for other accounting information in the financial statements for a sample of 869 US bank-year observations over the period 1992-1995. The results suggest that the value relevance of disclosed fair values of loans differ across the three mentioned components. The pricing coefficients on nondiscretionary components are positive and statistically significant. The discretionary

component that is deemed for signalling purposes is positively priced and statistically significant. Conversely, the estimated coefficient on the discretionary component associated with opportunism is negative and statistically significant. Lastly, the pricing coefficient on noise is statistically insignificant.

Another strand of accounting literature focuses on the use of private information by managers for option pricing model inputs, and how this might affect the information provided to investors. Such studies are of particular interest to the present thesis since they provide insight into the impact of managerial discretion, in terms of inputs for stock options valuation models, on the reliability of accounting information. With a great deal of similarity, the managerial discretion over the inputs of fair value estimates might affect the reliability of level 3 fair values. A study by Aboody et al. (2006) addresses the stock-based compensation expense disclosed under SFAS 123 and evaluates whether firms tend to underestimate the option value through their discretion over the inputs of valuation models. They identify two incentives for firms to understate the values of disclosed option expenses, mainly, increasing shareholder' perceptions of profitability and minimising the perceptions that the compensation paid to executives is excessive. Also, they use firms' corporate governance structure (measured by Investor Responsibility Research Centre score for shareholders' rights) to consider management's opportunity to understate option expense. The study is conducted using a sample of 3,368 US firm-year observations over the period 1996-2001. They estimate the option values based on pricing models with inputs following the guidelines of SFAS 123 and compare them with the disclosed amounts. The analysis shows a significant negative relation between the calculated and the understatement of disclosed option expenses, concluding that option expense is higher for firms having greater incentives as well as opportunity to do so. Also, the level of understatement tends to increase with the stock option based compensation and weak corporate governance and to a lesser extent with the excessiveness

of executive pay. These results are stronger for input assumptions subject to greater managerial discretion.²⁸

Similarly, Bartov et al. (2007) conclude that managers opportunistically use the inherent discretion by SFAS No. 123 to understate disclosed option expenses. They conduct the analysis based on a large sample of 9,185 firm-years observation from 1996 to 2004. Their empirical findings indicate that while firms seem to use both historical and forward-looking information in the estimation of stock options (i.e. to estimate the expected volatility) as required by SFAS No.123, the importance of each type of information in estimating the volatility inversely relates to their relative values. In a further investigation, they find that this behaviour (i.e. understating stock option expense) is highly associated with managerial incentives and/or ability to do so.

The study of Hodder et al. (2006) confirms the conclusion that firms tend to exercise a considerable discretion over the model valuation inputs, however, it shows that a large proportion of firms in their sample exercises value-increasing discretion when they value stock option expenses under SFAS 123. The empirical analysis is conducted based on sample of 1,748 firm-year observations over the period 1995-1998. The aggregate effect of discretion is measured by the difference between the disclosed option expenses and estimated expenses based on the guidelines of SFAS 123. Yet, it should be noted that the conclusion of Hodder et al. (2006) is drawn from a relatively short sample period compared to Aboody et al. (2006) and Bartov et al. (2007).

There is little research that investigates country-level factors that might affect the value relevance and reliability of fair value estimates. Country-level characteristics might play a role in mitigating measurement bias and noise inherent in fair value estimates. In his study of the disclosure quality under IFRS7, Bischof (2009) reports a variation in disclosure quality between European

²⁸ For expected option life and expected stock price volatility input assumptions compared to the interest rate and expected dividend yield input assumptions.

countries. He explains that by differences in the enforcement level as well as the interpretation of IFRS 7 by country banking supervision. The study was conducted based on a sample of 171 banks operating in 28 European countries for the first year of mandatory adoption (i.e. 2007). Similarly in the study of Fiechter and Novotny-Farkas (2014), countries are classified into two categories, market-based and bank-based, expecting that in the latter the level of behavioural bias towards fair values is likely to be higher. Based on a sample of nearly 1,000 bank-year observations listed on 50 countries over the period 2006-2009, market value of equity is regressed on the three categories of financial instruments under study (held for trading, those that were designated at initial recognition at fair value through profit or loss, and available for sale) after controlling for other financial statement information. The results show that bank-based countries are found to be associated with lower value relevance of fair values which might be explained by the lower enforcement level and higher measurement errors (or bias) in comparison to market-based countries.

The literature also examines the impact of corporate governance mechanisms on the quality of fair value information. For instance, Song et al. (2010) find that firms characterised by strong corporate governance tend to have more reliable and value relevant level 3 fair values compared to those with weak corporate governance.

The study reviewed above by Verriest et al. (2013) shows that firms are opportunistic in adopting IAS 39; they appear to postpone the early adoption of IAS 39 when there is a bad news. Again, in this case strong corporate governance results in early adoption of IAS 39. The analysis is carried out for a sample of 223 European firms, of which 71 are financial firms; and the corporate governance data are drawn from the Risk Metrics corporate database. The focus is centred on three corporate governance characteristics at firm-level derived from the database: the functioning of the board of directors, the independence of the board of directors and the effectiveness of the audit committee.

A working paper by Bhat (2013) examines the association between the value relevance of fair value gains and losses, risk management disclosure and corporate governance. The argument here is that risk disclosures have the potential to reveal information regarding the fair value estimation process, and hence regarding the quality of the fair value information. The disclosure quality is proxied using 14 disclosures items in the annual reports on the management of market, credit and operational risks; and a measure for corporate governance provided by the Institutional Shareholder Services. They use a sample of 176 listed US banks over the period 2001-2009 for the two tests, the relation between corporate governance strength and disclosure level, as well as the effect of both corporate governance and disclosure on fair value estimates quality (i.e. its association with stock market return). The results suggest that there is a positive association between the strength of corporate governance and the level of risk disclosure and between the level of disclosure and the market pricing of fair value gains and losses. Moreover, this positive association is stronger for banks during the financial crisis period, for those with risky assets as well as for those with poor performance. As such, investors seem to consider the fair value gains and losses for firms with a high level of risk disclosure and strong corporate governance as more reliable and value relevant.

A recent study, reviewed above, by Huang et al. (2015) reports that the positive association between level 3 fair values and firms' cost of capital is lower for firms with strong corporate governance. Moreover, the differential impact between level 3, on one hand, and level 1 and level 2 fair values, on the other hand, is smaller for firms characterised by strong corporate governance mechanisms.

In sum, the literature reviewed above reports that information asymmetry increases when fair values are measured based on management's expectations and projections, which affects the quality of fair value information. Measurement bias and error problems are particularly high for level 3 fair values and other fair value estimates based on unobservable inputs. In this context,

previous studies show that the relevance and reliability as well as disclosure quality of fair values tend to vary across countries suggesting that institutional factors might have an influence on the quality of fair value information. Similarly, strong corporate governance practices are found to play an important role in mitigating bias and error problems associated with the fair value of financial instruments with no established markets.

2.3.4 Discussion and summary on the value relevance of fair value

The value relevance is typically measured by the statistical association between accounting information, and herein disclosed and/or recognised fair values, and market value of equity. Prior research in the US shows that disclosed and recognised fair values of financial assets and liabilities are value relevant to investors and provide incremental value relevant information relative to their historical cost (amortised cost). In specific, previous empirical findings confirm that the fair values of investment securities are indeed value relevant to investors, even for those traded in thin markets (Barth, 1994; Barth et al., 1995; Ahmed and Takeda, 1995; Nelson, 1996; Eccher et al., 1996; Barth et al., 1996; Carroll et al., 2003). Several studies show similar results for the disclosed fair value estimates of derivatives (Venkatachalam 1996; Seow and Tam, 2002). Other studies, however, report that the valuation coefficients on fair values of off-balance sheet items, including derivatives, are not statistically significant (Nelson, 1996; Eccher et al., 1996; Barth et al., 1996), which might be attributed to ambiguities in the disclosed fair values. Interestingly, Ahmed et al. (2006) find that the valuation coefficients on recognised fair values of derivatives are statistically significant compared to insignificant corresponding coefficients on disclosed derivatives. With respects to financial instruments with no established markets such as loans and long-term debt, the results are mixed (see Barth et al., 1996; Eccher et al., 1996; Nelson, 1996). For example, net loan numbers are largely based on inputs other than observable market prices; and as such their estimated fair values are expected to be less reliable.

Fewer studies have investigated the quality of fair value information in a non-US context. A Danish study by Bernard et al. (1995) documents some evidence of manipulating mark-to-market loan loss provisions. Interestingly, Fiechter and Novotny-Farkas (2014) report lower value relevant financial instruments designated on initial recognition at fair value through profit or loss compared to those held for trading. In a more recent study, Drago et al. (2013) find that the fair value estimates of net loans by EEA banks provide incremental value relevant information. Barth et al. (2014) document that the reconciliations from local accounting standards to IFRS related to financial instruments are value relevant to investors.

These studies support the view that fair value measures provide investors with useful information for valuation purposes. However, the value relevant and reliability of fair values vary with inputs used to estimate fair values. The requirements of fair value hierarchy disclosure in accordance with SFAS No. 157 (effective since 2007) and IFRS 7 (effective since 2009) allow researchers to evaluate the value relevance of fair values across the levels of fair value hierarchy.

Three studies investigate the value relevance of fair value hierarchy under SFAS No. 157 reported by US financial firms, namely Kolev (2009), Song et al. (2010) and Goh et al. (2015). They provide evidence that level 1 fair values, based on quoted market prices, are more value relevant and reliable than level 3 fair values, based on unobservable inputs. The valuation coefficient on level 2 fair value is higher than that on level 3 fair values, however the difference is not always significant. Accordingly, Riedl and Serafeim (2011), Liao et al. (2013) and Huang et al. (2015) show that level 3 fair values are associated with higher cost of capital and greater information asymmetry. Fiechter, and Meyer, (2010) document that managers tend to use the discretion afforded by level 3 fair values for the purpose of big bath accounting in times of financial crisis. Yet there is scant research that assesses the changes in the quality of financial reporting as a result of the enhanced disclosure requirements under IFRS 7. As far as I am aware, there is only one

study by Bischof (2009) that reports an improvement in the disclosure quality in both financial statements and in risk reports of European banks following IFRS 7 adoption.

It has been argued that fair value estimates of financial assets and liabilities, for which active markets do not exist, can introduce bias (management discretion) or/ and noise (measurement error), which in turn leads to lower accounting information quality (Landsman, 2007; Penman, 2007). In this context, a branch of accounting research evaluates the impact of managerial opportunism on the reliability and relevance of fair value estimates. For instance, Beaver and Venkatachalam (2003) find that the pricing coefficient on the discretionary component of net loans is negative and statistically significant. Another strand of the literature addresses the use of private information by managers for option pricing model inputs. This literature is of particular interest to the present thesis since it provides insight into the impact of managerial discretion, in terms of inputs for stock option valuation models, on the reliability of accounting information. With a great deal of similarity, the managerial discretion over the inputs of fair value estimates might affect the reliability of level 3 fair values. Aboody et al. (2006) and Bartov et al. (2007) report that managers opportunistically use the discretion inherent in SFAS 123 to understate the disclosed option expenses; and weak corporate governance is associated with higher level of stock option understatement. Yet, using a shorter sample period, Hodder et al. (2006) find that firms exercise value-increasing discretion in the valuation of stock option expenses under SFAS 123.

Prior studies show the quality of fair value information seems to vary across countries. Bischof (2009) provides empirical evidence of variation in the quality of disclosure under IFRS7 between European countries. Fiechter and Novotny-Farkas (2014) report results suggesting that bank-based economies compared to market-based economies are associated with lower value relevance of fair values, which might be explained by the lower enforcement level and higher measurement errors (or bias). Similarly, the accounting literature has also turned attention to whether stronger

corporate governance mechanisms can mitigate measurement bias and noise in fair value estimates. Kolev (2009) and Song et al. (2010) support this view by documenting that firms characterised by stronger corporate governance tend to have higher value relevant level 3 fair values. Verriest et al. (2013) show that strong corporate governance results in early adoption of IAS 39 in case of bad news. Bhat (2013) finds that strong corporate governance is associated with more value relevant fair value gains and losses. Huang et al. (2015) document lower positive association between level 3 fair values and firms' cost of capital for firms with strong corporate governance mechanisms. Thus, it can be argued that both the institutional environment and corporate governance mechanisms have an impact on the quality of fair value estimates, particularly in the absence of active markets for financial assets and liabilities under measurement.

2.4 Conclusions

Part I in this chapter reviewed accounting studies on the impact of IFRS adoption and of the financial crisis on financial reporting quality. Previous studies provide inconclusive results on the changes in the value relevance of accounting information as a result of IFRS adoption. In most of these studies, the sample comprises firms from a wide range of industries, with little attention directed to the distinctive characteristics of each industry, which might explain the inconclusive results reported in prior literature. In the same vein, few studies have investigated the impact of IFRS adoption on value relevance of financial reporting for financial sector firms. These latter are characterised by holding a considerable percentage of their assets and liabilities measured at fair values, compared to other industries. To contribute to the existing literature, this thesis therefore focuses on financial sector firms, which hit most by the financial crisis, in examining the impact of IFRS adoption on the value relevance of accounting information of financial firms in the EEA and Switzerland.

Additionally, the financial crisis is expected to have an impact on the value relevance of accounting information. Accounting literature shows that in times of financial crisis and the higher possibility of default, investors tend to place more weight on balance sheet amounts rather than income statement numbers for valuation purposes. This is because balance sheet numbers tend to reflect liquidity values, while the income statement reveals the future growth opportunities. Building on the findings of prior literature, institutional environment factors as well as firm-specific corporate governance practices are expected to influence the valuation role of the balance sheet versus the income statement in the crisis. In countries with low level of investor protection and for firms with weak corporate governance mechanisms, investors rely more upon liquidity value in the balance sheet with less emphasis is placed on income statement numbers providing information on future abnormal earnings. As such, this thesis investigates the impact of financial crisis on the valuation roles of the balance sheet and income statement amounts. Moreover, the valuation roles of the two financial statements during the financial crisis are analysed as function of both country-level institutional environment well as firm-level corporate governance.

Part II in this chapter reviewed accounting literature concerning the value relevance of fair value information. Previous studies show that disclosed and recognised fair values for financial assets and liabilities are value relevant to investors and provide incremental information relative to their historical cost (amortised cost). However, the reliability and relevance of fair value measures varies with inputs used for fair value estimates. The requirement of fair value hierarchy disclosure based on the inputs used in accordance with SFAS No. 157 (effective since 2007) and IFRS 7 (effective since 2009) allows researchers to evaluate the value relevance of fair values across the levels of fair value hierarchy. In this context, prior literature in the US reports empirical findings that level 1 fair values, based on quoted market price, are more value relevant than level 3 fair values, based on unobservable inputs. Accordingly, it is documented that level 3 fair values are

associated with greater cost of capital and information asymmetry. In addition to measurement errors associated with level 3 fair values, managers in some cases might opportunistically manipulate valuation inputs for fair value estimates. Prior research suggest that the institutional environment and corporate governance mechanisms can play a role in mitigating the bias and noise inherent in fair value estimates, and thus reduce the reliability concerns. It is expected that firms with weak corporate governance and domiciled in a country characterised by low investor protection are associated with higher information asymmetry problem; and hence estimated fair values are less value relevant. This thesis contributes to the literature by providing empirical evidence from non-US markets by investigating whether the value relevance of fair value amounts varies across the three level of hierarchy under IFRS 7. Furthermore, it examines whether institutional environment factors as well as firm-level corporate governance practices affect the value relevance of fair values.

Based on prior literature reviewed above, the next chapter provides the development of the relevant hypotheses in addition to the details of the models employed to test them.

Chapter 3: Research Methodology

3.1 Introduction

This chapter develops the research methodology for the empirical analyses conducted in the thesis. The chapter is divided into two parts, Part I and Part II, corresponding to the two empirical parts in this thesis.

Part I (Section 3.2) addresses the research methodology to evaluate the impact of IFRS adoption and of the crisis on the value relevance of accounting information. It starts with the hypotheses development in Section 3.2.1. Then, Section 3.2.2 provides a brief background to the valuation model proposed by Ohlson (1995) and used in this thesis as a baseline model. Section 3.2.3 presents the models used to investigate the effect of IFRS and the crisis on the value relevance. This is followed by the interaction models used to test the impact of institutional environment and corporate governance factors. Section 3.2.4 describes the measures of country-level institutional environment and firm-level corporate governance employed in this thesis. Finally, Section 3.2.5 provides a detailed description of the sample selection procedures, as well as of the distribution of sample firms by country and specialisation.

Part II (Section 3.3) provides the details of the research methodology to investigate the value relevance of fair value hierarchy under IFRS7. Based on prior literature and empirical findings discussed in the previous chapter, Section 3.3.1 develops the research hypotheses to be tested. Section 3.3.2 shows the main model adopted to test the value relevance of the three levels of fair value, as well as the interaction models to incorporate the impact of institutional environment and corporate governance factors. Section 3.3.3 describes the sample selection procedures and the distribution of firm-year observations across the countries under study.

Section 3.4 concludes the chapter.

Part I

3.2 Research methodology for the impact of IFRS and the crisis on value relevance

3.2.1 Hypotheses development²⁹

The vast majority of firms listed on stock exchanges in the European Economic Area (EEA) as well as Switzerland³⁰ are mandated to prepare their financial statements under IFRS for the fiscal years beginning on or after 1 January 2005.³¹ For many adopters, IFRS presented a substantial shift in their financial reporting since IFRS tend to differ significantly from local accounting standards that were required before 2005 (Soderstrom and Sun, 2007; Armstrong et al., 2010; Barth et al., 2014). In this context, it has been argued that financial statements prepared under IFRS provide higher quality information to investors in comparison to most local financial reporting standards (local GAAP) (e.g. Ball, 2006; Daske and Gebhardt, 2006). IFRS are seen as a set of largely principle-based accounting standards requiring accounting measures to better reflect a firm's economic performance and position, which is expected to increase the quality of accounting information (Barth et al., 2008). For instance, IFRS restrict managers' discretion through minimising accounting alternatives, resulting in higher quality accounting information (Ashbaugh and Pincus, 2001). Similarly, accounting harmonisation in European countries is considered an essential step in the process of integration of financial and banking markets. This can improve the comparability of financial statements and reduce the number of adjustments required by investors to address the differences in accounting standards across countries. More comparable financial statements are expected to provide investors with information necessary for equity investment decisions. Thus, obtaining more value relevant accounting information has frequently been associated with IFRS adoption.

²⁹ The hypotheses in this section correspond to research questions 1A, 2A, 3A and 4A listed in Chapter 1.

³⁰ In Switzerland, listed firms are required to prepare their financial statements using either IFRS or the US GAAP since 2005.

³¹ Although the voluntary IFRS adoption before 2005 was permitted in some EEA countries, the majority of firms adopted IFRS for the first time in 2005 (i.e. when they became mandatory).

Yet one set of international accounting standards may not reflect the differences in economies across countries (Ball, 2006; Capkun et al., 2008; Jeanjean and Stolowy, 2008; Armstrong et al., 2010). Apart from accounting standards there are several political, social and institutional factors which may determine the value relevance of accounting information. Similarly, the enforcement level varies across countries, resulting in variation in the effect of IFRS adoption on accounting information quality. It has also been argued that limiting managerial discretion in terms of accounting alternatives could limit a firm's ability to report accounting numbers that are more reflective of firm's economic conditions, and thus reduce the quality of accounting information (Barth et al., 2008). In developed countries, the high quality accounting information attributed to IFRS has been questioned, given that the accounting information environment in those countries has developed without the adoption of IFRS (Goeltz, 1991; Jones and Wolnizer, 2003; Christensen et al., 2007). Evaluating the impact of IFRS adoption on the quality of accounting information is a contested issue among accounting academics and practitioners. Interestingly, existing accounting studies provide inconclusive results on whether the value relevance of financial reporting has improved following mandatory IFRS adoption (see, for example, Liu et al., 2011; Oliveira et al., 2010; Tsalavoutas et al., 2012). The majority of previous studies use samples comprising firms from a wide range of industries. Nevertheless industry-specific characteristics are expected to have an influence on the value relevance of financial statement information (Barth and Clinch, 1998; Anandarajan et al., 2011).

The present research contributes to the existing literature by investigating the impact of IFRS adoption on the value relevance of financial reporting of a single industry: financial firms. IFRS expand the use of fair value measurements and enhance the disclosure about fair value amounts. For instance, compared to local accounting standards in several European countries,³² IAS 39

³² For a systematic review of accounting standards in several European countries comparing to IFRS see Bae et al. (2008).

Financial Instruments: Recognition and Measurement requires many financial assets and liabilities to be measured at fair value in the balance sheet and the changes in fair values to be recognised in the income statement (Barth et al., 2014). This is of particular relevance to financial sector firms since fair value-related standards prominently target financial assets and liabilities widely held by such firms. In addition, financial firms that engage in traditional banking activities (i.e. deposit-taking and loan-making) are required to estimate loan loss provisions (LLPs) in order to reflect the changes in the expected future loan losses. Compared to firms from other industries, banks are more likely to be influenced by IFRS requirements for LLPs which are different from those stipulated under local accounting standards in many EEA countries (Gebhardt and Novotny-Farkas, 2011; Leventis et al., 2011).³³

Due to their distinct characteristics, financial institutions are systematically excluded in a large body of previous research investigating the impact of IFRS adoption on the value relevance of accounting information (e.g. Gjerde et al., 2008; Devalle et al., 2010; Liu et al., 2011; Tsalavoutas et al., 2012). The analysis focuses, therefore, on financial sector firms, and the first hypotheses can be formulated as follows:

H1A. The Value relevance of accounting information increases following mandatory IFRS adoption by financial firms.

Financial reporting regimes require the preparation of financial statements including both the balance sheet and the income statement. Under IAS1 *Presentation of Financial Statements*, four statements are required to be prepared by the reporting entity: a statement of financial position (the balance sheet), a statement of profit and loss and other comprehensive income (the income statement), a statement of changes in equity and a statement of cash flows (IASB, 2014a). As stated by Watts (1974) and Holthausen and Watts (2001), the balance sheet and the income

³³ Specifically, IAS 39 requires an incurred loss model to report LLPs in comparison to forward looking model stipulated in Europe prior IFRS adoption (for more details see Gebhardt and Novotny-Farkas, 2011 and Leventis et al., 2011).

statement fulfil different roles or at least they provide incremental information relative to each other. Focusing on valuation purposes, the balance sheet produces information to facilitate loan decisions and the monitoring of debt contracts (Barth et al., 1998a). As such, it presents information on the liquidation value of the firm (i.e. what is available to the firm's debtholders in case of default). On the other hand, the income statement provides information prominently for equity valuation by reflecting the unrecognised net assets or, more generally, the opportunities for abnormal earnings. Example of unrecognised intangible asset is the human capital and internally generated assets of financial firms. Firms are not allowed to recognise the value of a trained workforce in their balance sheets since it does not meet the definition of an asset. Even in the case of a substantial amount invested in training, these costs are expensed in the income statement. In general, the unrecognised assets are not directly observable, yet their revenues and expenses are reflected in the income statement (Barth et al., 1998a; Barth, 2006).

This view of distinctive roles of the balance sheet and income statement suggests that during a financial crisis investors use more the information provided by the former. Taking into consideration the higher probability of default in times of financial crisis, the balance sheet providing information on liquidation values will increase in importance for valuation purposes. The importance of liquidation values is related to the abandonment option held by the management. The abandonment is defined as "an option to put assets to outside purchasers at a strike price equal to the liquidation, or exit, values of the assets" (Barth et al., 1998a: 4). The abandonment option exists when there is a difference between liquidation values versus values in use³⁴ for the assets held by the firm; this is the case when there is an incomplete market (ibid). However, as financial sector firms have been hit most adversely by the financial crisis in recent years, it is expected that the economic values of those firms' assets are very close to liquidation values since the exercise of the abandonment option becomes higher. Moreover, in times of

³⁴ Value in use of an asset is defined as the present value of the future cash flows expected to be derived from the asset (IASB, 2014b).

financial crisis fair values (market values) of assets, used widely by financial firms, reflect the liquidation rather than future payoffs (Allen and Carletti, 2008). Operationally, previous studies use the book value of equity, the summary measure of the balance sheet, as a proxy for liquidation value, especially when the financial health of the firm deteriorates (see Berger et al., 1996; Burgstahler and Dichev, 1997; Collin et al., 1999).

In contrast, investors are expected to place less importance on the income statement numbers as the probability of default increases during a financial crisis. This is because the significance of other unrecognised net assets and future growth opportunity, reflected in the income statement, for valuation purposes diminishes over the time of crisis.

Another argument can be put forward here is that part of the effect of a financial crisis on the value relevance of the balance sheet and income statement of financial firms is related to fair value accounting. In times of financial crisis there is a greater discrepancy between market values and the underlying economic values of assets and liabilities in conjunction with a higher measurement error and bias (Hellwig, 2009; Plantin et al., 2008; Bhat et al., 2011; Chen et al., 2013). In this situation, Penman (2007: 41) explains that the negative impact of fair value accounting on the value relevance of accounting information will be more pronounced in the income statement compared to the balance sheet (i.e. resulting in a “less uninformative income statement”).³⁵ That is, fair value accounting might produce less informative income statements relative to balance sheets in times of crisis. It is expected, therefore, that the value relevance of income statements will be lower compared to that of balance sheets when the financial crisis hits. In this study, the book value of equity and net income are employed as summary measures of the balance sheet and of the income statement, respectively. Based on the aforementioned discussion, the second hypothesis can be formulated as follows:

³⁵ Peasnell (2006) explains how the measurement errors of fair values are compounded in the income statement in comparison to the balance sheet (the same can apply to the discrepancy between market prices and true economic values).

H2A. The value relevance of equity book value increases, while the value relevance of net income decreases for financial firms as the financial crisis evolves.

This study also evaluates whether the value relevance of accounting information depends on the institutional business environment at country level during the crisis period. La Porta et al. (1999) argue that institutional environment characteristics, which determine the level of investor protection against opportunistic behaviour, are of cardinal importance in making investment decisions. Even though listed firms listed in the EEA and Switzerland prepare their financial statements under the same accounting regime, IFRS, financial reporting practices are not determined by accounting standards alone (Bushman and Smith, 2001; Ball et al., 2003; Ball, 2006; Tadesse, 2006). For instance, the institutional environment can affect the managers' flexibility in exercising their discretion when choosing between accounting alternatives.

Besides, the state of the economy affects the firms' performance. In periods of financial crisis, managers of distressed firms might manipulate accounting numbers or use accounting alternatives to shift performance figures upward in order to avoid reductions in their compensations due to the deterioration of share prices (Charitou et al., 2007; Kothari and Lester, 2012). A number of previous studies reports some evidence of a decrease in financial reporting quality during a financial crisis (e.g. Choi et al., 2011; Iatridis and Dimitras, 2013). Specifically for financial firms in a crisis period, managers could engage in earnings management behaviour³⁶ using loan loss provision (Cohen et al., 2014) or via less timely accounting write-downs (Vyas, 2011). However, as argued in Ball et al. (2000); Ball (2006); Hope (2003); Daske et al. (2008) and Houque et al. (2012), in presence of strong institutional settings, managers have less incentives and opportunities to manipulate accounting information at the expense of shareholders.

³⁶ Earnings management happens when managers exercise their discretion in financial reporting and/or in structuring transactions to "either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers" (Healy and Wahlen, 1999: 368).

Overall, the institutional environment plays a complementary role in the quality of financial reporting, and this is particularly true during a financial crisis. In countries characterised by a weak institutional environment it is reasonable to expect that in times of financial crisis investors place more valuation weight on the balance sheet numbers and less valuation weight on the income statement figures. Therefore, for countries with lower investor protection (i.e. weaker institutional settings), the present study predicts that the value relevance of book value of equity will be higher, and conversely the value relevance of net income will be lower during the financial crisis. The third hypothesis is stated as follows:

H3A. In times of financial crisis, the value relevance of equity book value increases and that of net income decreases for firms in the countries characterised by a weak institutional environment.

As indicated in the accounting literature, based on the argument of agency theory, managers might not always act in the best interest of firms' shareholders. Instead, they tend to make sub-optimal or self-maximisation decisions (Jensen and Meckling, 1967; Jensen, 1986). A firm's corporate governance is the mechanism that aims to protect shareholders against managerial opportunism. When the interests of both managers and shareholders are perfectly aligned, coupled with effective corporate governance practices, accounting information is more likely to reflect the economic reality of a firm. On the other hand, given a setting where there is a conflict between the interests of managers and those of the shareholders in conjunction with weak corporate governance practices, it is likely to observe opportunistic behaviour by managers to manage accounting numbers. This results in a decrease in the relevance of accounting information for valuation purposes.

In highly concentrated ownership structures, another agency problem might stem from the conflicts of interests between minority and majority shareholders, particularly if the latter are involved in the management of the firm (Claessens et al., 2000; Faccio et al., 2001; Thomsen et

al., 2006). On one hand, large controlling shareholders have incentives to collect information in order to monitor management performance, and accordingly exercise their voting power to force managers to act in the best interests of shareholders (Shleifer and Vishny, 1986; La Porta et al., 1998; La Porta et al., 2000; Conyon and Florou, 2002; Essen et al., 2013). On the other hand, an agency problem arises when large shareholders extract private benefits from their position as controlling shareholders at the expense of minority investors (Shleifer and Vishny, 1997; Faccio et al., 2001; Bhojraj and Sengupta, 2003; Liu and Magnan, 2011). It has been argued that controlling shareholders have incentives to manage accounting figures in order to mask the firm's economic conditions and to conceal their private benefits at the expense of other investors (Leuz et al., 2003). Thus, another purpose of corporate governance is to mitigate the agency conflict between the majority shareholders and other investors.

That is, effective corporate governance plays a critical role in mitigating the agency conflicts between management and shareholders as well as between majority and minority shareholders. Accordingly, strong corporate governance mechanisms are expected to increase the quality of accounting information available to all investors, mainly non-controlling shareholders. In this vein, the accounting literature provides some empirical evidence that strong corporate governance mechanisms are associated with higher quality financial reporting and disclosure (e.g. Klein, 2002; Park and Shin, 2004; Kent et al., 2010; Ntim et al., 2013; Verriest et al., 2013).

During a financial crisis the expropriation of shareholders in general becomes more severe. For instance, managers tend to engage more with opportunistic behaviour given the drop in the expected rate of return on investment. The shareholders thus take into account the weakness in corporate governance when making investment decisions (Mitton, 2002). In this context, corporate governance practices become more pivotal in determining the value relevance of accounting information in times of financial crisis. It is expected that for firms with weak corporate governance mechanisms investors will place more importance on the balance sheet

numbers reflecting liquidation value rather than the income statement figures which present future growth opportunities. Therefore, the fourth hypothesis is formulated as follows:

H4A. In times of financial crisis, the value relevance of equity book value increases and that of net income decreases for firms with weak corporate governance mechanisms.

3.2.2 Model background

To test the four hypotheses discussed above, this study follows Ohlson (1995) who proposed a valuation model that links the market value of a firm to its reported accounting numbers. The model has been developed based on three assumptions. Firstly, it fulfils the requirement of Dividend Discount Model (DDM)³⁷ that the share price of a firm is equal to the present value of expected future dividends per share. Secondly, it assumes the “clean surplus” relation holds (i.e. the change in book values of equity between two periods equals the earnings minus dividends over the same period).³⁸ Finally, the main contribution of this model is the third assumption of a linear information dynamic regarding the stochastic time-series behaviour of residual income.

Residual income for period t is expressed as:

$$NI_{t+1}^a = NI_t - (r * BV_{t-1}) \quad (3.1)$$

and clean surplus relation as

$$BV_t = BV_{t-1} + NI_t - D_t \quad (3.2)$$

where NI_t is the reported net income for the period t , r is the firm’s cost of equity, BV_{t-1} is the book value of equity at the beginning of the period t , D_t is the dividends distributed to shareholders at time t , and NI_{t+1}^a is the residual income for the period $t+1$.

³⁷ Barker (2001: 18) stresses that “any theoretical valuation model must be reconcilable with the DDM, or else it is conceptually flawed”.

³⁸ In addition to clean surplus relation, it requires dividends to be deducted from current book value, but not from current earnings.

Ohlson (1995) imposes that residual income follows an Autoregressive Process of AR(1) as follows

$$NI_{t+1}^a = \omega NI_t^a + v_t + \varepsilon_{1t+1} \quad (3.3)$$

and

$$v_{t+1} = \gamma v_t + \varepsilon_{2t+1} \quad (3.4)$$

ε_{1t+1} and ε_{2t+1} are disturbance terms with zero mean. Both ω and γ are restricted to be non-negative and less than one.

This model suggests that residual income at time $t+1$, NI_{t+1}^a , is expressed as a linear function of two variables; first the lag residual income (i.e. at time t), NI_t^a , and second a variable v_t for “other information” (i.e. other than accounting information) which also satisfies the autoregressive process, AR(1), as shown in (3.4).

Specifically, the term v_t refers to all relevant factors that may affect the future performance of the firm, including future earnings. As explained by Rees (1995), other information might include:

“macroeconomics activities and their relationship to the company’s activities, breakdowns of the company’s activities by industrial and geographical segment, knowledge of the company’s relative strength in the markets in which it operates, knowledge of patent protections and so on. Some of this information will be available in notes to the financial statements but some will not” (Rees, 1995: 234).

In the context of Ohlson’s (1995) model, “other information” v_t can impact future residual income independently of current and past residual income.

Due to its abstract nature, the variable has been dropped in the main stream of accounting studies that employ Ohlson’s (1995) model (e.g. Barth et al., 1999; Myers, 1999; Hung and Subramanyam, 2007; Balachandran and Mohanram, 2011; Venter et al., 2014). Barth et al. (1999)

argue that if the model holds, v_t has no bearing on parameters estimated for the accounting amounts used in the model (i.e. book value of equity and earnings).³⁹ Aligning most closely with the view that “other information” can be dropped, Easterday et al. (2011) show empirically that omitting “other information” is not important in a relatively long period of time, such as one year. Thus this thesis employs valuation models based on Ohlson’s (1995) work after dropping the variable “other information” from the models estimated.

It is worth mentioning that there is no consensus among accounting researchers on the variable(s) that should be used to proxy for v_t . Some prior studies adopt models based on the assumption that “other information” is single-dimensional, and thus its current value is the only useful factor in predicting the future values.⁴⁰ More specifically, v_{t-1} is used as a (noisy) proxy for current “other information”, v_t . The studies of Akbar and Stark (2003) and Dedman et al. (2009) are examples. Another stream of studies uses analysts’ forecasts as a source of value relevant information about future performance (see, for example, Dechow et al., 1999; Ohlson, 2001; Cheng, 2005). In these studies, “other information” is confined only to future earnings, and thus proxy for rational forecasts using consensus analyst forecasts of earnings.

Based on the three assumptions mentioned above, Ohlson (1995) derived a valuation model where the market value of a firm (MV_t) is expressed as a linear function of current reported book value of equity (BV_t) and current residual income (NI_t^a) in addition to other information (v_t). That is⁴¹,

$$MV_t = BV_t + b_1 NI_t^a + b_2 v_t \quad (3.5)$$

One of the desirable properties of such a model is that it links market value to current accounting information. As discussed above there is no consensus in accounting literature on how to proxy

³⁹ They also argue that when accounting data are not related to other information (in this case the model does not hold), the estimated parameters for accounting numbers could be affected by the omitted other information from the study model.

⁴⁰ Additionally, it is assumed that there is no constant term in other information autoregressive equation (AR(1)).

⁴¹ For details, see Appendix 1 in Ohlson (1995: 682).

for “other information” or whether it should be dropped from the model. In the studies that drop the variable of “other information”, an intercept and an error term are added to the model as follows:

$$MV_t = b_0 + b_1BV_t + b_2NI_t^a + \varepsilon \quad (3.6)$$

Ohlson’s (1995) model assumes that accounting is unbiased (i.e. on average the market value of equity equals the book value of equity). Due to conservative accounting, among others, there is always a difference between market value of equity and book value of equity in actual setting. In this context, Feltham and Ohlson (1995) develop the basic Ohlson’s (1995) model by considering conservative accounting practices.⁴² In the context of the present research, the Ohlson model is used to refer to both the original, 1995 model, and its refinement by Feltham and Ohlson.

The Ohlson model can be restated in terms of current earnings rather than future residual income. Substituting the equation of clean surplus accounting (3.2) and the definition of residual income (3.1) with (3.5) would yield after some simplifications:

$$MV_t = (1 - k)BV_t + k\varphi NI_t - kD_t + \alpha_2 v_t \quad (3.7)$$

where $\varphi = \frac{(1+r)}{r}$,

and $k = r * a_1 = \frac{r*w}{(1+r-w)}$

In this model the market value of equity is expressed as a weighted average of both book value of equity and net income (before dividends) multiple in addition to the “other information” not captured by accounting figures. From the definition of k , k has a one-to-one relation with w (and a_1). As w satisfies the condition $0 \leq w \leq 1$ then k satisfies $0 \leq k \leq 1$.

On the one extreme, if $k = w = 1$, in such case a firm generates one-for-one persistent earnings (i.e. investors expect the firm to generate the same levels of earnings in future years), then $MV_t = \varphi NI_t - D_t$. In other words, investors will value the equity based on earnings multiple.

⁴² For details, see Feltham and Ohlson (1995).

At the other extreme, when $k = w = 0$, in such cases a firm experiences unusually high or low earnings because there is a component of reported earnings that has very low or even zero persistence (i.e. transitory earnings), then $MV_t = BV_t$. The market value of a firm is determined only by current book value of equity.

Low persistent earnings imply less valuation weight placed on earnings and more valuation weight on book value of equity and vice versa. One implication of Olson's equity valuation model is that a lower valuation coefficient on earnings corresponds to a higher valuation coefficient on book value of equity. Previous accounting studies report empirical findings supporting this implication (e.g. Burgstahler and Dichev, 1997; Collins et al., 1997).

That is, the market value of equity is expressed as a linear function of book value of equity and earnings. The empirical version adopted in most accounting studies is the regression of market value of equity on the current reported book value of equity and current net income in addition to the intercept (b_0) and an error term (ε), which is known as the "price model":

$$MV_t = b_0 + b_1BV_t + b_2NI_t + \varepsilon \quad (3.8)$$

Furthermore, another version of valuation model can be derived from the price model, called the "return model". Based on surplus accounting relation, the change in book value of equity between two periods, t and $t-1$, can be written as a function of net income and dividends (from equation (3.2)) as follows:

$$\Delta BVE = NI_t - d_t \quad (3.9)$$

Taking the first difference of price model (3.8) and substituting (3.9) for ΔBVE results in the following equation:

$$\Delta MV_t = a_1 (NI_t - d_t) + a_2 \Delta NI_t + \Delta \varepsilon \quad (3.10)$$

where Δ denotes the change in the amount between two periods, t and $t-1$. Moving d_t to the left hand side and then dividing all the variables by beginning of the year market value yields the return model⁴³:

$$R_t = b_0 + b_1 \frac{NI_t}{MV_{t-1}} + b_2 \frac{\Delta NI_t}{MV_{t-1}} + \varepsilon \quad (3.11)$$

where R_t is the stock return for year t .

3.2.3 The models employed

To examine the first hypothesis on the changes in the value relevance of accounting information following the mandatory introduction of IFRS, this study adopts the price model that is widely used in previous literature such as Collins et al. (1997); Bartov et al. (2005); Barth et al. (2008); Balachandran and Mohanram (2011); and Venter et al. (2014). In the price model, the firm's market value is estimated as a function of the book value of equity and net income (as in equation (3.8)):⁴⁴

$$P_{it} = b_0 + b_1 BVPS_{it} + b_2 EPS_{it} + \delta D_t + \varepsilon_{it} \quad (3.12)$$

where P_{it} is the market value per share (share price) of a financial firm i three months following the end of fiscal year t (e.g. 31 March if the fiscal year ends on 31 December).⁴⁵ These three months are to ensure that the accounting information is published and publicly available to investors (Lang et al., 2003; Barth et al., 2008). $BVPS_{it}$ is the book value of equity per share for financial firm i at the end of the fiscal year t . EPS_{it} is the reported net income⁴⁶ per share of financial firm i for the fiscal year t and D_t is a year dummy variable for year t . All the variables are scaled using the number of outstanding shares in year t to address the econometric concern

⁴³ This model is used as robustness check for the price model in evaluating the impact of IFRS adoption on the value relevance of accounting information.

⁴⁴ Hereafter EPS is used to refer the net income (NI) divided by the number of outstanding shares.

⁴⁵ Some prior studies use the market value of equity six months after fiscal year-end in the price model (e.g. Liu et al., 2011; Barth et al., 2012). Therefore, as a robustness check, the main models are re-estimated using six months market value of equity following the end of the financial year (see Section 4.6).

⁴⁶ Throughout the terms "net income" and "earnings" are used interchangeably.

raised in terms of heteroskedasticity and scale bias in the price model (Kothari and Zimmerman, 1995).⁴⁷

Financial firms tend to hold a significant proportion of their balance sheet items in form of financial instruments that are measured based on fair value or amortised cost. Consistent with this, Bischof et al. (2011) report descriptive statistics showing that the majority of the assets and liabilities are recognised in the balance sheet at fair value or amortised cost for a global sample of financial firms (see their Table 1). Moreover, the majority of fair value assets and liabilities are measured based on observable inputs (i.e. level 1 and level 2 fair values, see, for example, table 5.1 in this thesis). For fair value amounts determined using observable inputs, the carrying amounts in the balance sheet represent market consensus on their underlying economic values. Besides, even for those that are marked at amortised historical cost, such as loans and advances as well as held-to-maturity investments, their book values will be often close to fair values unless the market experiences significant changes in the interest rates (Penman, 2013). Put together, the book value of the assets and liabilities reported by financial firms is likely to be close to their fair values (i.e. their underlying economic values). Hence, one would expect that investor would assign a value to net assets amounts (book value of equity) close to their balance sheet value. Therefore, in the price model (equation 3.8), it might be reasonable to expect a valuation coefficient on book value of equity (b_1) not far from one.

Since the analysis covers the period from 1999 to 2012, six years before IFRS adoption and eight years of IFRS adoption, the study uses panel data models in the first empirical part. By using the analysis of panel data, the ε_{it} in equation 3.12 is decomposed into two components, $\varepsilon_{it} = u_i + v_{it}$

⁴⁷ A number of previous studies scale all the variables in the price model by the lagged total assets (see, for example, Marquardt and Wiedman, 2004; O'Hanlon and Taylor, 2007; Manganaris et al., 2015). As a robustness check, the main models are re-estimated after scaling all the variables by the lagged total assets (see Section 4.6). The main results are also reported in Appendix V using lagged book value of equity as an alternative scaling method following some prior research (Lai and Krishnan, 2009; Rees and Valentincic, 2013; Middleton, 2015).

where u_i denotes the unobserved time-invariant individual characteristics of each financial firm, and v_{it} is the normal distributed error component (a random time-varying component). This decomposition allows controlling for unobserved heterogeneity in the sample of financial firms. Pooled Ordinary Least Squares (OLS) estimation omits the individual characteristics of each firm by estimating a single intercept. Omitting relevant unobservable factors, which tend to be invariable in the short run, would imply economically misspecified models, and in turn would result in biased or inconsistent estimates (Hsiao, 2003). Panel data analysis is conducted using either fixed effects models, also known as the within group estimation, or random effects models. The assumption behind the former is that the individual characteristic is correlated with the independent variables. For random effects models, the firm-specific characteristic or the variation across firms is random and uncorrelated with the independent variables.

The Breusch and Pagan Lagrange-multiplier is conducted to test for random effects. The null hypothesis of $\text{Var}(u_i) = 0$ is rejected, suggesting that the individual characteristic is not 0 and that pooled OLS estimation in this case will be biased. Hausman test is then employed to test the violation of random effect where the independent variables are orthogonal to the fixed effect (Hausman, 1978). The test rejects the null hypothesis of no correlation between unit effect and independent variables. The study runs, therefore, the regressions using the fixed effect models of panel data.

In examining the first hypothesis *H1A*, whether the value relevance of accounting information has improved following IFRS adoption, this study tests the significance of differences in the explanatory powers between the two periods of interest, pre-IFRS adoption period (1998-2004) and IFRS adoption period (2005-2012). Following Agostino et al. (2011: 444), this study uses a bootstrapping technique. Specifically, it calculates the Z statistics as follows:

$$Z \text{ statistics} = (R_2^2 - R_1^2) / \sqrt{\sigma_{R_2^2}^2 + \sigma_{R_1^2}^2} \quad (3.13)$$

where R_2^2 and R_1^2 are the within R squared from the fixed effect regression for the periods of interests, IFRS adoption and pre-IFRS adoption, respectively. $\sigma_{R_2^2}^2$ and $\sigma_{R_1^2}^2$ are the variance of coefficients of determinations of the within-group estimator using bootstrap methods. To this end, within R_2^2 and R_1^2 are estimated from different samples with replacement extracted from the dataset. By repeating this procedure 1,000 times this study can obtain an empirical distribution for the within coefficient of determinations which can be used to test the difference between the two groups, pre-IFRS adoption and IFRS adoption. Barth et al. (2008) recommend the use of bootstrapping since it does not require any prior assumption about the distribution of R^2 and can be used for estimators with unknown distribution such as within coefficient of determination. To test the second hypothesis (*H2A*) on the impact of the financial crisis on the valuation coefficient of book value of equity and net income following IFRS adoption, this study adopts the same model presented in (3.12) with an interaction dummy variable for the financial crisis period:

$$P_{it} = b_0 + b_1Crisis + b_2BVPS_{it} + b_3Crisis * BVPS_{it} + b_4EPS_t + b_5Crisis * EPS_{it} + \delta D_t + \varepsilon_{it} \quad (3.14)$$

where *Crisis* is a dummy variable coded 1 for the years of the crisis (2008-2012) and 0 for the pre-crisis period (2005-2007). Appendix III presents the yearly GDP growth as well as the changes in the non-performing loans to total loans ratio for the countries under study. These indicators are widely used in previous studies as indicators of an economic crisis and its impact on financial firms (e.g. Demirgüç-Kunt and Detragiache, 2005; Barrell et al., 2010; Reinhart and Rogoff, 2011). Both indicators suggest a continuous adverse effect of the period 2008-2012 on the economies and the financial institutions of the countries under investigation, including non-Eurozone countries. Therefore, for the purpose of this study, the crisis period is identified as the period between 2008 and 2012 referring to both the global financial crisis and the European sovereign debt crisis. The interest is focused on detecting whether the financial crisis causes

structural changes in the valuation roles of book value of equity and earnings. To this aim, the coefficients b_3 and b_5 reflect whether there has been any change and the direction of the change. The coefficient b_1 represents the impact of the crisis period on the market value of equity, while b_2 and b_4 can be interpreted as the valuation of book value of equity and net income, respectively, before the crisis period.

To test the third hypothesis (*H3A*), this study employs the price model after including two interaction terms: between the strength of institutional environment and book value of equity as well as between the strength of institutional environment and earnings over the financial crisis period (2008-2012), as follows:

$$P_{it} = b_0 + b_1 BVPS_{it} + b_2 INSRANK * BVPS_{it} + b_3 EPS_{it} + b_4 INSRANK * EPS_{it} + \delta D_t + \varepsilon_{it} \quad (3.15)$$

INSRANK is a measure of the institutional settings that includes: *Efficacy of corporate boards*, *Strength of auditing and reporting*, *Protection of minority shareholders' interests*, *Regulation of securities exchanges*, and *Judicial independence*.⁴⁸ The study uses the means of institutional variables during the period from 2008 to 2012, which implies that the variable *INSRANK* remains the same through the estimation period. Therefore, the institutional environment features are captured by the firm-specific characteristics component of composite error in fixed effect estimation. The study constructs a standardised score based on the principal-component factor analysis of the five aforementioned institutional environment variables, named *INSSCORE*. Based on this score, a decile rank (*INSRANK*) is created and it ranges from 0, representing the highest values of *INSSCORE*, to 9, associated with the lowest values of *INSSCORE*, and then scaled by 9. It is predicted that the coefficient on the interaction between institutional environment (*INSRANK*) and book value of equity (*BVPS*) will be positive (i.e. b_2 is positive). In contrast, the valuation coefficient on the interaction between institutional environment

⁴⁸ These measures are explained in the following section.

(*INSRANK*) and net income (*EPS*) (b_4) is expected to be negative. In this form of the model, b_1 and b_3 can represent the valuation of book value of equity and earnings, respectively, for firms from countries with strong institutional environment.

Similarly, this study tests *H4A* on the impact of firm-level corporate governance mechanisms on the valuation coefficients of book value of equity and net income during the time of financial crisis. The model employed is:

$$P_{it} = b_0 + b_1 BVPS_{it} + b_2 GOVRANK * BVPS_{it} + b_3 EPS_{it} + b_4 GOVRANK * EPS_{it} + \delta D_t + \varepsilon_{it} \quad (3.16)$$

GOVRANK is the constructed empirical measure based on five-firm corporate governance variables, namely, number of board meetings (*Board meeting*), size of audit committee (*Audit size*), number of audit committee meetings (*Audit meeting*), number of block holder (*No of block*) and audit fees (*Audit fee*).⁴⁹ A standardised score, *GOVSCORE*, is created using the principal-component factor analysis of the governance variables. The study uses the means of the corporate governance variables for the period 2008-2012. Corporate governance practices at firm-level vary across countries and can be associated with country-level factors such as investor protection and legal enforcement (La Porta et al., 2000). To address this concern, following Verriest et al., (2013), firm-level governance score (*GOVSCORE_i*) is regressed on country dummy variables (*COUNTRY_n*) as follows:

$$GOVSCORE_i = a_0 + \sum b_n COUNTRY_n + \varepsilon_i \quad (3.17)$$

The residuals from this estimation are used to create a decile governance rank, *GOVRANK*, which ranges from 0, representing the strongest corporate governance mechanisms, to 9, indicating the weakest corporate governance mechanisms, and then scaled by 9. That is, *GOVRANK* represents the strength of firm-level corporate governance mechanism after country-level variation is

⁴⁹ These measures are discussed in detail in the next section.

filtered out. The coefficients b_2 and b_4 in the regression (3.16) reflect the change in the valuation coefficient of book value of equity and net income as a function of corporate governance mechanisms at firm level. If weak corporate governance results in an increase (decrease) in the valuation importance of book value of equity (net income) during the crisis period, b_2 (b_4) will be positive (negative) and statistically significant. Since *GOVRANK* ranges from strong to weak corporate governance, b_1 and b_3 can be interpreted as the valuation on book value of equity and earnings, respectively, for firms with strong governance mechanisms.

All the models presented above are estimated for the entire sample of financial firms as well as for the sub-sample of banks separately. Also, as an additional analysis, the impact of mandatory IFRS adoption and the financial crisis on the value relevance of accounting information are re-examined after the main-sample of financial firms partitioned by firm size into: small and large firms (using the sample median of total assets). In the same spirit, the sub-sample of banks is partitioned into: low and high Tier 1 ratio banks (see Section 4.6).

It is worth mentioning that the impact of the institutional environment and corporate governance mechanisms is investigated during the financial crisis period only. This is because the motivations for managers to manipulate accounting figures and use accounting alternatives to shift performance figures are greater during the crisis. Hence, the role of institutional environment and corporate governance is likely to be more pervasive in times of financial crisis. Also, studying the impact of institutional environment and governance characteristics on the value relevance of accounting in a tranquil period is beyond the scope of this thesis. Besides, the data for corporate governance variables are manually collected from firms' annual reports and/or corporate governance reports over the crisis period. Due to time limitation, no data are collected to test the impact of corporate governance on the valuation roles of the financial statements before the crisis period.

3.2.4 Institutional environment and corporate governance variables

A number of previous studies focuses exclusively on the characteristics of legal systems by classifying countries into common law and code law groups (see, for example, Jaggi and Low, 2000; Lourenço and Curto, 2008; Anandarajan et al. 2011; Barth et al., 2012). However, a simple classification of countries according to the origin of their legal systems might not gauge the strength of the legal and institutional environment. Spamann (2010) finds few significant differences between common law versus code law countries in terms of one of the widely used investor protection measures ‘The Antidirector Right Index’⁵⁰ developed by La Porta et al. (1998).

In addition, several recent accounting studies use institutional variables, on the one hand, and accounting and market data, on the other hand, from two different periods of time (see, for instance, Davis-Friday et al., 2006; Anandarajan et al., 2011). This could result in less powerful tests for the impact of country-specific characteristics on the value relevance of accounting information. Consistent with this view, Kaufmann et al. (2008) report significant changes in the country-level institutional variables over time. For this reason, this study uses data from the Global Competitiveness Report issued by the World Economic Forum⁵¹ for the period 2008-2012, which captures country-level characteristics during the financial crisis (i.e. period for which accounting and market data are drawn). Specifically, five country-specific variables are used: *Efficacy of corporate boards*, *Strength of auditing and reporting*, *Protection of minority shareholders’ interests*, *Regulation of securities exchanges* and *Judicial independence*.

⁵⁰ La Porta et al. (1998) calculated The anti-director rights index using the following six shareholder right measures: (i) the country allows shareholders to mail their proxy votes to the firm; (ii) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting; (iii) cumulative voting or proportional representation of minorities in the board of directors is allowed; (iv) an oppressed minorities mechanism is in place; (v) the minimum percentage of share capital that entitles a shareholder to call for an extraordinary shareholders' meeting is less than or equal to 10 percent (the sample median), and finally (vi) shareholders have pre-emptive rights that can only be waived by a shareholders' vote. The index is formed by adding a value of 1 as such it ranges from zero to six.

⁵¹ <http://www.weforum.org/>

For the five institutional environment variables used in this thesis, World Economic Forum (WEF) draws its data using an annual survey called Executive Opinion Survey. Most of the questions in the annual survey, including those used in this thesis, ask participants to evaluate specific aspects of their operating environment using a scale from 1 to 7. At one end of this scale, 1 indicates the worst possible situation, while at the other end of the scale, 7 indicates the best. For instance, 1 represents the lowest level of protection of minority interests, while 7 shows the highest level of minority investors protection. According to WEF, the survey aims to capture crucial information that is not otherwise available on a global scale (WEF, 2013). However, collecting data via survey has its limitations. Surveys raise some concerns about the reliability of the data collected because of lack of knowledge about who and how carefully the respondent completes the questionnaire. For example, the survey could be completed by the executive's assistant rather than the executive him/herself. World Economic Forum addresses this concern by working with a large set of partner institutes worldwide which are selected based on their understanding and expertise of the national business environment as well as their capacity to reach out to leading business executives. Their data are collected via a variety of methods including face-to-face interviews with business executives, telephone interviews and via an online survey. Saunders et al. (2012) posit that sending online surveys to a specifically named correspondent can mitigate some of the reliability concerns related to surveys.

Another reliability concern arises when the respondents have insufficient knowledge or experience. Again, partner institutes are selected based on their understanding and expertise of the national business environment and thus being able to select the executives that are perceived to be able to participate in the survey (WEF, 2013). In general, WEF works closely with its partners to increase the reliability of its surveys by ensuring that the survey is conducted according to the sampling guidelines and therefore in a consistent and timely manner across the globe.

In addition, for some dimensions of institutional business environment no cross-country objective data exists. Survey data can capture the crucial difference between de jure and de facto institutional characteristics. Interestingly, Kaufmann and Kraay (2016) state that the distinction between “subjective” and “objective” measures of governance at country level is mostly a superficial one, since nearly all such measures depend to a large extent on judgment and/or legal opinions and experiences of respondents in varying degrees.

Finally, there is no consensus among accounting scholars on the variables that best capture the characteristics of the investment institutional environment. Recent accounting studies use a wide range of business environment measures at country level, for example, rule of law and regulatory quality by Kaufmann and Kraay (2016) and audit quality and accounting enforcement by Brown et al. (2014), which are also based on survey data. The selected institutional variables are employed in this thesis because of the data availability for a range of countries that cover a number of aspects that capture at least some differences across countries in terms of financial reporting settings.

Efficacy of corporate boards measures management accountability to shareholders. Low values indicate that management has little accountability to investors, whereas high values suggest that investors and boards exert strong supervision of management decisions.⁵² Efficient boards which monitor management behaviour can reduce the agency problem that might arise from divergent interests among shareholders and managers (Peasnell et al., 2005; Coles et al., 2008). Previous studies report an association between accounting information quality and efficacy of corporate boards (see, for instance, Klein, 2002; Verriest et al., 2013).

Strength of auditing and reporting standards measures the enforcement of auditing and accounting standards regarding company financial performance (Huoque et al., 2012). Ball et al. (2003) argue that the adoption of high quality accounting standards can be considered an essential

⁵²At this stage, efficacy of corporate boards can give an indicator on the strength of corporate governance at country level. In the analysis, other indicators reflecting firm-specific corporate governance mechanism are used.

step to provide high quality financial statements with useful information for a variety of users, particularly the investors. However, country-level accounting and auditing standards enforcement level plays a critical role in obtaining the high quality financial reporting. In this sense, adopting IFRS with weak enforcement mechanisms is more likely to result in a reduction in the perceived quality of accounting information under IFRS (Holthausen, 2003).

Protection of minority interests measures the extent to which the interests of minority shareholders are protected by the legal system. La Porta et al. (1999), Ball et al. (2000), Daske et al. (2008), and Francis and Wang (2008) document that the legal environment, which determines the level of investor protection from opportunistic behaviour, is of cardinal importance in making investment decisions. La Porta et al. (1998) emphasise that strong legal environment reduces the agency problem between minority and majority shareholders as well as the agency problem between shareholders and managers.

Regulation of securities exchanges assesses the regulation and supervision of securities exchanges. A strong enforcement of securities exchanges regulation can deter insiders from manipulating accounting figures in order to profit from trading in the firm's shares (Hope, 2003).

Judicial independence measures the extent to which the judiciary is independent from influences of members of government citizens, or firms. Judicial independence is expected to affect business environment. For instance, it is difficult to consider cases where the judicial system performs poorly, while there is a strong enforcement of accounting standards and regulation of securities exchanges (Huoqe et al., 2012).

Previous studies report empirical findings supporting the impact of the selected institutional factors on financial reporting quality, including value relevance (Jaggi and Low, 2000; Leuz et al., 2003; Burgstahler et al., 2006; Daske et al., 2008; Li, 2010; Anandarajan et al., 2011; Houque et al., 2012; Cai et al., 2014).

At firm level, this study uses a set of five corporate governance variables for several reasons. Firstly, a multi-dimensional construct captures a wider sense of corporate governance in a firm than a single measure of corporate governance (Vafeas, 1999; Aguilera et al., 2008). In this sense, empirical findings suggest that aggregated indices better capture the strength of firm corporate governance than single indicators (Davila and Penalva, 2006; Larcker et al., 2007; Verriest et al., 2013). Secondly, the five variables selected in this study are used to measure the diligence of board of directors, diligence and effectiveness of audit committee, the ownership structure, and external audit quality. It is worth mentioning here that there is not a well-developed theory about the multi-dimensional structure of corporate governance or a well-accepted conceptual basis for selecting the variables that measure the underlying characteristics of corporate governance (Larcker et al., 2007). Thirdly, the variable selection is also determined by the level of disclosure provided by European financial firms. For example, some firms in the sample do not disclose the number of audit committee members with financial expertise, which limits the ability to use this variable for the purpose of the thesis as the size of the sample decreases. In fact, the data collection started with a wide range of corporate governance variables used in prior research including, for example, the attendance rate of the board of directors and that of the audit committee; however, due to data availability constraints the number of selected variables is reduced.

One of the concerns in this thesis using a multi-country setting is that there is a considerable variation in corporate governance structure for companies in the countries under investigation. For example, some countries use two tier board structure (e.g. Germany and Austria) and others adopt one tier board structure (e.g. Spain and the UK); while in other European countries firms can choose the structure of their boards (e.g. in Italy and France). To mitigate this concern, the constructed corporate governance variable is regressed on country dummy variables to filter out country-level governance characteristics (see Section 3.2.3 and Section 3.3.2).

The thesis employs five corporate governance variables: *Board meeting*, *Audit size*, *Audit meeting*, *No of block* and *Audit fee*.

The board of directors has the roles of ratifying and monitoring managerial activities, evaluating the management performance and rewarding or penalising such performance (Fama and Jensen, 1983a; Fama and Jensen, 1983b). This study uses the number of annual board of directors meetings (*Board meeting*) to measure the intensity of board activities. Less frequent meetings might be associated with lack of member commitment and/or insufficient time for effective monitoring.⁵³ The number of board meetings is widely used in previous studies as a proxy for board diligence (see, for example, Larcker et al., 2007; Zhang et al., 2007; Ettredge et al., 2011). Other characteristics of the board of directors are not employed in this study either because of the lack of disclosure in corporate reports, or due to considerable variation in board structure and characteristics across the countries under scrutiny (such as two tier and one tier board structure). One of the main roles of the audit committee is to ensure the quality of financial reporting. Regulators have often expressed their strong preference for an audit committee that meets frequently, since this leads to a better communication between committee members and both internal and external auditors (Barua et al., 2010). That is, more frequent audit committee meetings (*Audit meeting*) are likely to be associated with a more effective committee in order to maintain high quality accounting information. Previous studies report an association between the number of annual audit committee meetings held and the disclosure quality (Kent and Stewart, 2008; Ettredge et al., 2011; Barakat and Hussainey, 2013), and the incidence of financial reporting problems (Faber, 2005).

Another dimension that might be associated with the effectiveness of the audit committee is its size (*Audit size*). It has been argued that a larger audit committee might allow for greater diversity and depth of knowledge and experience among the committee members (Karamanou and Vafeas,

⁵³ Boards of directors also tend to meet more frequently when firm faces difficulties and shows poor performance (Vafeas, 1999; Brick and Chidambaran, 2010).

2005; Barua et al., 2010). This, in turn, can increase the effectiveness of audit committee in maintaining high quality accounting information.⁵⁴

Higher audit quality is expected to lead to higher quality financial reporting, given that auditors are less likely to provide incorrect audit opinions. Empirical findings support the view that large auditors (such as the Big 4) charge higher audit fees and thus provide higher quality audit (Francis, 2004; Francis and Yu, 2009). In this study audit fees (*Audit fee*) have been used as a proxy for external audit quality.⁵⁵ Similar approach is adopted in previous studies (e.g. Carcello et al., 2002; Goodwin-Stewart and Kent, 2006; Mitra, 2007; Bliss et al., 2011).

Finally, large shareholders have the incentives to monitor management performance and exercise their voting power as controlling shareholders to force management to act in the interest of shareholders. It is reasonable thus to expect that the higher the number of large shareholders (*No of block*⁵⁶), the lower the agency problems between managers and shareholders (Shleifer and Vishny, 1986; La Porta et al., 1998; La Porta et al., 2000; Essen et al., 2013; Verriest et al., 2013). On the other hand, controlling shareholders might extract private benefits from their position as controlling shareholders at the expense of minority shareholders (Faccio et al., 2001; Bhojraj and Sengupta, 2003; Liu and Magnan, 2011).

3.2.5 Sample selection procedures

The BankScope database by Bureau van Dijk is used to identify financial firms that are listed in the European Economic Area (EEA) and Switzerland⁵⁷ and issue consolidated financial statements under IFRS. Table 3.1 shows the sample selection procedures. The initial population includes 308 (230) financial firms (banks) listed in the EEA and Switzerland after 2005 and issue

⁵⁴ It is worth mentioning that some prior research finds no association between audit committee size and accounting information quality (e.g. Abbott et al., 2004; Krishnan and Visvanathan, 2008).

⁵⁵ The majority of the financial firms in this study engage a Big 4 auditor, therefore, audit fees rather than auditor size are used to proxy for the quality of audit.

⁵⁶ *No of block* is the number of shareholders who hold more than 5% of voting rights.

⁵⁷ In Switzerland, listed firms are required to prepare their financial statements using either IFRS or the US GAAP since 2005.

their financial statements in accordance with IFRS. All tests throughout the first empirical part of this thesis are carried out for financial firms (including banks) and for the subsample of banks separately. Banks differ from other financial intermediaries in that their activities include deposit-taking and loan-making activities and they are subject to regulatory capital requirements. To identify the first year of IFRS adoption, this study uses the annual reports for listed firms downloaded either from their websites or through the Thomson One database. For those that do not provide annual reports in English, Datastream and BankScope databases are used to identify IFRS adoption year. In case there was no consistency about the first year of IFRS adoption between the two databases, the most recent year is chosen (i.e. if BankScope shows 2002 as the first year of IFRS adoption while Datastream identifies 2003 as the first time when financial statements reported based on IFRS for the same firm, then 2003 is chosen).

Then those firms that adopted IFRS voluntarily before 2005 were excluded. Accordingly, 42 financial firms including 30 banks were excluded, most of them listed in Germany, Austria and Switzerland, where firms were allowed to prepare their consolidated financial statements in accordance with IFRS before 2005.⁵⁸ This elimination is an essential distinction for this study since it avoids the selection bias due to voluntary IFRS adoption when firms are seeking to achieve the hypothesised economic consequences (Sodestrom and Sun, 2007) or to meet the conditions to be listed on some stock exchanges (Barth et al., 2008; Aubert and Grudnitski, 2011). Similarly, 4 (3) financial firms (banks) that adopted IFRS after 2005 were eliminated. More specifically, firms that prepared their financial statements in accordance with non-EU accounting standards before 2005 were allowed to defer IFRS adoption until 2007 in Germany, Norway, Poland and the UK. Finally, this study eliminates those firms with no market and accounting data for at least two years over the period of pre-IFRS adoption (1998-2004) and four years⁵⁹ of IFRS

⁵⁸ For *H2A* addressing the impact of the financial crisis on the value relevance, those voluntarily adopters were added to the sample as a robustness check (see Section 4.6).

⁵⁹ Four years after IFRS to allow testing the impact of financial crisis in *H2A*.

adoption period (2005-2008). The final sample comprises of 194 financial firms, of which 148 are banks. Data were obtained for the five country-level measures of institutional business environment from the 2008-2012 Global Competitiveness Report.

For firm-level corporate governance variables, the data were hand collected from the annual reports and/or corporate governance reports published by firms and available online. Accordingly, 99 (83) financial firms (banks) are excluded due to data unavailability for corporate governance variables. Therefore, the sample consists of 95 financial firms, including 65 banks, to test the impact of corporate governance.

Table 3. 1 Sample selection procedures

	Financial firms (incl. Banks)	Banks (only)
The total number of firms (in the EEA + Switzerland) that are listed after 2005 and issuing consolidated financial statement under IFRS	308	230
Excluding those that voluntarily adopted IFRS before ⁶⁰ 2005	(42)	(30)
Excluding those that adopted IFRS after 2005 ⁶¹	(4)	(3)
Excluding those with no market and accounting data for at least two years over pre-IFRS adoption (1998-2004) and four year of IFRS adoption (2005-2008)	(68)	(49)
The main Sample	194	148
Excluding those with no corporate governance data	(99)	(83)
The corporate governance sub-sample	95	65

Source: BankScope

Table 3.2 reports the distribution of observations over the years under investigation. Based on the exclusion criteria (see above), the final sample comprises 2799 financial firm-year observations for the entire study period (1998-2012), divided into pre-IFRS adoption phase (1263 firm-year

⁶⁰ As a robustness check, those that adopted IFRS voluntarily before 2005 are included in evaluating the impact of the crisis, institutional factors and corporate governance, when data available (see Section 4.6).

⁶¹ Germany, UK, Poland and Norway permit companies that are listed on exchanges outside of the EU and prepare their primary financial statements in 2005 using a non-EU GAAP (in most cases this would be the US GAAP) to delay IFRS adoption until 2007.

observations) and IFRS adoption phase (1536 firm-year observations). For those firms with corporate governance data available in their financial reports, the sub-sample consists of 470 financial firm-year observations, of which 320 bank-year observations, to test the impact of governance mechanisms.

Table 3. 2 Firm-year observations distribution⁶²

year	Main Sample		Those with corporate governance data	
	Financial firms (incl. Banks)	Banks (only)	Financial firms (incl. Banks)	Banks (only)
1998	160	123	-	-
1999	167	128	-	-
2000	177	134	-	-
2001	183	139	-	-
2002	188	143	-	-
2003	194	148	-	-
2004	194	148	-	-
2005	194	148	-	-
2006	194	148	-	-
2007	194	148	-	-
2008	194	148	95	65
2009	193	147	95	65
2010	192	146	95	65
2011	188	142	93	63
2012	187	141	92	62
Total	2799	2131	470	320
Pre IFRS	1263	963	-	-
Post IFRS	1536	1168	470	320
Average Pre IFRS ⁶³	180	138	-	-
Average Post IFRS	192	146	94	64

Table 3.3 reveals the specialisation breakdown of the samples based on the BankScope classification. As mentioned above, for all the hypotheses in the first part, the tests are carried out for a subsamples of banks (financial firms that engage in deposit-taking and loan-making activities). Banks include: bank holding and holding companies, commercial banks, cooperative banks, real estate and mortgage banks, saving banks and specialised governmental credit institutions. As a further check for those firms classified as banks, firms with average net loan to

⁶² In addition to the data unavailability and exclusion criteria, the variation in the number of observations from year to year might be due to some firms were listed while others delisted or merged over the study period.

⁶³ Average observations per year.

total assets lower than 10% over the period 2005-2012 were excluded from the sub-sample of banks. In other words, the subsample of banks includes only those firms with traditional banking activities. Accordingly, five firms are excluded from the sub-sample of banks (the majority of them originally being classified as bank holding companies by BankScope).

Table 3. 3 Sample and specialisation breakdown⁶⁴

Specialisation	The whole sample of financial firms		Those with corporate governance data	
	Freq.	Percent	Freq.	Percent
Bank Holding & Holding Companies	33	17.01	20	21.05
Commercial Banks	79	40.72	37	38.95
Cooperative Bank	21	10.82	7	7.37
Finance Companies	5	2.58	2	2.11
Investment & Trust Corporations	17	8.76	12	12.63
Investment Banks	10	5.15	7	7.37
Private Banking & Asset Management Companies	3	1.55	1	1.05
Real Estate & Mortgage Bank	4	2.06	-	-
Savings Bank	16	8.25	5	5.26
Securities Firm	6	3.09	4	4.21
Total	194	100	95	100

Table 3.4 reports the country breakdown of the entire sample of financial firms and the sub-sample of banks. As can be noticed, 19 (18) countries are represented in the main sample of financial firms (the sub-sample of banks).⁶⁵ For the entire sample of 194 financial firms, UK has the largest number of firms in the sample (31) with 452 observations, followed by France and Italy, with 425 and 303 observations related to 30 and 21 financial intermediaries, respectively. Two countries, Iceland⁶⁶ and Luxemburg, have been represented by only two firms, with 22 and 30 observations respectively. For the sub-sample of 148 banks, France (22) and Italy (19) have the largest number of firms, with 306 and 275 observations respectively, followed by Denmark

⁶⁴ Based on BankScope classification.

⁶⁵ To test the impact of corporate governance in *H4A*, the number of countries represented fall down to 18 (17) in the entire of financial firms (the subsample of banks) due to data unavailability regarding corporate governance variables (see Appendix IV).

⁶⁶ It is worth mentioning that Iceland was hit severely by a financial crisis starting in 2008 when the three largest banks in the country collapsed and were bought by the government.

with 14 banks (204 observations). In addition to Iceland and Luxemburg, Finland has been represented by 2 banks with 22, 30 and 30 observations, respectively.

Table 3. 4 Country breakdown⁶⁷

Country	Financial firms (incl. Banks)			Banks only		
	Freq.	Obs.	Percent	Freq.	Obs.	Percent
Austria	5	75	2.68	5	75	3.52
Belgium	3	44	1.57	3	44	2.06
Denmark	14	204	7.29	14	204	9.57
Finland	5	73	2.61	2	30	1.41
France	30	425	15.18	22	306	14.36
Germany	7	99	3.54	4	54	2.53
Greece	11	152	5.43	11	152	7.13
Iceland	2	22	0.79	2	22	1.03
Ireland	4	60	2.14	4	60	2.82
Italy	21	303	10.83	19	275	12.90
Luxemburg	2	30	1.07	2	30	1.41
Netherland	6	85	3.04	3	40	1.88
Norway	17	255	9.11	15	225	10.56
Poland	11	156	5.57	11	156	7.32
Portugal	4	60	2.14	4	60	2.82
Spain	9	132	4.72	9	132	6.19
Sweden	9	127	4.54	5	75	3.52
Switzerland	3	45	1.61	-	-	-
UK	31	452	16.15	13	191	8.96
	194	2799	100	148	2131	100

⁶⁷ This is country breakdown for testing the first hypothesis *H1A*. The country breakdowns to test *H2A*, *H3A* and *H4A* are reported in Appendix IV.

Part II

3.3 Research methodology on value relevance of fair value hierarchy

3.3.1 Hypotheses development⁶⁸

The past few decades have increasingly witnessed a shift in financial reporting toward more fair value-based financial statements. Regulators and accounting standards setters, such as FASB and IASB, introduced market-based measures as substitutes for historical cost-based measures. Such emphasis on market-based measures is motivated by their presumed decision relevance to investors. In a complete and perfect market, fair value represents investors' consensus on the expected future cash flows of an asset or liability (Barth and Landsman, 1995; Hitz, 2007). Opponents of fair value-based accounting have questioned the reliability of fair value measures, especially in the absence of active markets for the assets and liabilities under measurement. In other words, reliability concerns are particularly pervasive for assets and liabilities that are measured using models highly affected by managerial expectations and projections.

In the absence of an active market for fair value assets and liabilities, it is reasonable to expect that using managers' estimates would raise the problem of information asymmetries between investors and managers. Considering level 3 fair value assets and liabilities, managers might obtain private information on the true economic values of assets (or liabilities) to the firm, and hence the most appropriate inputs for model-based valuation. Information asymmetry introduces, to a certain degree, two different problems, adverse selection and moral hazard (Landsman, 2007; Penman, 2007; Song et al., 2010).

One implication of adverse selection is when two apparently similar, but actually different, assets held by two different firms are valued in the same manner for assessing these firms' equities (Landsman, 2007). Given a case when there is no credible and verifiable information, firms holding assets with high underlying economic values might sell a portion of their assets.

⁶⁸ The hypotheses in this section correspond to research questions *1B*, *2B*, and *3B* listed in Chapter 1.

Alternatively, firms might be permitted to disclose the high quality underlying valuation assumptions, which can be verified by investors and other market participants. This can be achieved, for instance, by selecting a high cost external appraisals for asset valuation. Both alternatives imply that the credible signal must be costly, yet it is less costly for firms holding assets with higher underlying economic values (Landsman, 2007).

Secondly, the problem of moral hazard arises when managers exploit the private information they have on the true underlying economic values of assets and liabilities (and the appropriate inputs for model-based valuation) to obtain personal advantages. That is, they manipulate the information in the financial reports available to investors and other users. Landsman (2007) illustrates that managers reporting under a fair value regime might have incentives to value assets upward, which in turn results in higher income numbers and bonus-based compensation. Then, they manage the time to recognise any impairment and upward revaluation reversals by choosing the point with a minimum effect on their performance-based compensation. This is particularly true during a time of financial distress when there is a bonus reduction or even no bonus. Consistent with this view, Fiechter and Meyer (2010) provide empirical evidence that US banks used the discretion in level 3 fair value measurements for the purpose of big bath accounting during the most recent financial crisis.

However, it is worth mentioning that the managerial discretion inherent in fair value estimates allows managers to signal their private information to investors and other accounting information users. In this vein, Barth et al. (1998b) show that managers can use their private information to provide better estimates of bond fair values. This view presumes that managers use their privately accessed information in a natural fashion (Landsman, 2007), rather than for manipulating the financial image in order to achieve some private gain.

Given the adverse selection and moral hazard problems, accounting standard setters and regulators should decide the level of managerial discretion allowed under fair value accounting.

In other words, they should balance between the benefits of fair value estimates in reducing adverse selection problems by revealing managerial private information and the potential moral hazard arising from manager opportunistic behaviour associated with such estimates.

Furthermore, even in the absence of a moral hazard problem, fair value estimates (i.e. level 3 fair values assets and liabilities) are still subject to measurement errors. This is because level 3 fair values are estimated using expectations and assumptions rather than observable inputs, which can be verified by investors, from active markets.

In predicting how investors weigh different fair value levels to value the firm's equity, Song et al. (2010) identify two factors to be considered: discount rate and cash flows. Investors use higher discount rate for fair value numbers with greater uncertainty. In the same line, and to the extent that they perceive that reported assets (liabilities) are upwardly (downwardly) biased regardless of the nature of such bias, investors will adjust the expected cash flows. Both factors will result in lower valuation coefficient for the less reliable fair values (level 3) compared to the more reliable fair values (level 1 and 2).

Archival accounting studies show that information asymmetry and estimation error are associated with adverse selection, lower liquidity for trading shares, and greater information risk; this in turn results in a higher cost of capital to the firm (Diamond and Verrecchia, 1991; Bartov et al., 1996; Baiman and Verrecchia, 1996; Muller and Riedl, 2002). It is worth mentioning that given a case where there is no moral hazard problem, this effect still holds (Song et al., 2010). The higher the cost of capital to a firm, the lower the value of its assets and liabilities. Investors associate a higher cost of capital, and thus a lower value, to the assets (and liabilities) with less reliable valuation inputs. Hence, it is expected that investors place a higher discount rate for level 3 fair value assets and liabilities compared to more reliable fair value accounting figures (i.e. level 1 and level 2 fair value assets and liabilities).

Moving to the second downward effect, cash flows, investors perceive management's estimates to be higher (lower) than the underlying future cash flows of an asset (liability). Managers might exercise their discretion to overstate (or understate) accounting estimates,⁶⁹ given the subjective nature of such estimates. That is, certain accounting information estimates can be subject to managerial bias (Aboody et al. 2006; Hodder et al., 2006; Bartov et al. 2007). Considering the greater subjectivity associated with fair value level 3 assets and liabilities estimates, investors might adjust such estimates for firms' equity valuation. If investors perceive the estimated fair values as biased, they will adjust downward (upward) the reported level 3 fair value assets (liabilities). Furthermore, accounting information provides a mechanism for investors to monitor and discipline managerial performance (Bushman and Smith, 2001; Lambert, 2001). Less reliable accounting information (e.g. accounting estimates) is less useful for investors to monitor managerial behaviour that might have a negative impact on the firm's performance and its future cash flows. In line with this view, previous accounting studies report that the higher quality of accounting information is associated with a greater ability of investors to monitor the behaviour of management; and thereby leads to an improvement in firm's performance (e.g. Bens and Monahan, 2004; Biddle and Hilary, 2006; McNichols and Stubben, 2008; Hope and Thomas, 2008; Biddle et al., 2009; Chen et al., 2011). When accounting information becomes less reliable (i.e. of lower quality), investors will be less able to monitor and discipline managerial behaviour, leading to a lower firm's performance of unaccountable managers and/or to private advantages achieved by opportunistic managers. Such cases result in a lower firm value. Compared to level 1 and level 2 fair value assets and liabilities, level 3 fair values are less observable, making them less reliable for monitoring managerial performance (Song et al., 2010).

Taking into consideration the issues discussed above, investors are expected to decrease the weight they place on the accounting information that they perceive to be less reliable (i.e. level 3

⁶⁹ Overestimation or underestimation could be due to managerial optimism (Martin et al., 2006; Penman et al., 2007).

fair value assets and liabilities) for firm valuation (Maines and Wahlen; 2006, Goh et al., 2015). In contrast, level 1 and 2 fair values are less likely to be subject to measurement error and managerial manipulation (or optimism) since investors can verify the market observable inputs used in valuation. The valuation coefficient on level 3 fair value assets and liabilities is expected to be lower than the coefficients corresponding to level 1 and 2 fair values. The reliability (as well as the information asymmetry) of level 2 fair is likely to fall between those of level 1 and level 3 fair values (Song et al., 2010). The present study expects, therefore, the valuation coefficient on level 2 fair values to fall between the corresponding coefficients on level 1 and level 3. The first hypothesis in the second empirical part is stated in the alternative form as follows:

H1B. The value relevance of level 1 and level 2 fair values is higher than that of level 3 fair values.

The next hypothesis (*H2B*) introduces another variable, the institutional environment, which might affect the value relevance of fair value assets and liabilities. Information asymmetry problems are likely to be higher in a weak institutional environment. This thesis examines whether the value relevance of fair value net assets varies as a function of the strength of the institutional environment. Since the measurement error and managerial manipulation (and thus information asymmetry) are likely to be higher for fair value measurements based on unobservable inputs, the strength of the institutional business environment is more likely to be more effective at mitigating the information asymmetry problem of level 3 fair value measurements compared to level 1 and level 2 fair values.

Previous accounting studies highlight the importance of firms' incentives in determining the quality and the reliability of accounting information (see, for example, Ball et al., 2000; Ball et al., 2003; Leuz, 2003; Burgstahler et al., 2006). Given that fair value estimates require judgment as well as the use of private information, they provide firms with substantial discretion. The way

the firms use such discretion depends to a great extent on their incentives, which in turn are determined by many factors including the institutional environment (Ball, 2006; Daske et al., 2008). Consistent with this view, Bischof (2009) and Fiechter and Novotny-Farkas (2014) provide evidence that the disclosure quality of fair values under IFRS 7 and the value relevance of assets designated at fair value through profit or loss vary between countries.

To the extent that the institutional environment can mitigate the information asymmetry problem of level 3 fair values, investors are more likely to consider level 3 fair values as reliable, and thus value relevant. Stated in the alternative form, the second hypothesis is:

H2B. The institutional environment has a greater impact on the value relevance of level 3 fair values than on the value relevance of level 1 or level 2 fair values.

In addition to the country-level institutional environment, firm-level corporate governance mechanisms are expected to play a vital role at mitigating the information asymmetry problem of accounting information. A further analysis, therefore, considers the impact of corporate governance practices on the value relevance of fair value measurements. Again, corporate governance could become more critical for level 3 fair value measurements relative to level 1 and level 2 fair values, since the former involve more managerial discretion (and opportunism). This is because strong corporate governance mechanisms can be effective in monitoring financial reporting decisions and mitigating the opportunistic behaviour of managers (Klien, 2002; Mitra and Cready, 2005). Previous studies support the role of firm-level corporate governance in determining the quality of accounting information, especially when accounting standards require considerable judgement and the use of private information. For example, Verriest et al. (2013) show that strong corporate governance practices result in firms using IAS 39 less opportunistically. Aboody et al. (2006) and Bartov et al. (2007) report that firms characterised by weak corporate governance mechanisms tend to understate the stock option expenses. Bhat (2013) finds that strong corporate governance is associated with more reliable and value relevant

fair value gains and losses. In line with this study, Song et al. (2010) document that the value relevance of level 3 fair value assets reported under SFAS No.157 is higher for US firms with strong corporate governance mechanisms. Similarly, Penman (2007) emphasises the importance of the competence and the independence of the monitors in addition to the internal control effectiveness in mitigating the bias (caused by managerial discretion) inherent in level 3 fair value estimates. This leads to the third hypothesis expressed in the alternative form as follows:

H3B. The firm-level corporate governance mechanisms have a greater impact on the value relevance of level 3 fair values than on the value relevance of level 1 and level 2 fair values.

3.3.2 The models employed

This section describes the model used to examine the value relevance of fair value relevance hierarchy under IFRS 7. An accounting amount is deemed as value relevant to investors when it shows a statistical association with market value of firms' equity (or return) (Barth et al., 2001). Similar to the first empirical part (see Section 3.2.3), this part starts with the price model as the baseline specification to test the hypotheses on fair value hierarchy,⁷⁰ where the market value of a firm's equity is regressed on the book value of equity and reported net income. All the variables are scaled by the number of shares⁷¹ as follows (similar to (3.12)):

$$P_{it} = b_0 + b_1 BVPS_{it} + b_2 EPS_{it} + \delta D_t + \varepsilon_{it} \quad (3.18)$$

where P_{it} is the market value per share (share price) of a financial firm i three months following the end of fiscal year t (e.g. 31 March if the fiscal year ends on 31 December). The three months lag is needed to ensure that the accounting information is published and publicly available to

⁷⁰ A brief background for the price model is provided in Section 3.2.2.

⁷¹ This is to address the heteroscedasticity concerns due to scale effect in this model (for more details see Barth and Clinch, 2009). As a robustness check, the lagged total assets, instead of the number of outstanding shares, is used to scale all the variables similar to Marquardt and Wiedman (2004); O'Hanlon and Taylor (2007); and Manganaris et al. (2015) (see Section 5.5). Also the main models are re-estimated in Appendix V based on lagged book value of equity as another alternative scaling method. A number of previous studies use this method (e.g. Lai and Krishnan, 2009; Rees and Valentincic, 2013; Middleton, 2015).

investors (Lang et al., 2003; Barth et al., 2008).⁷² $BVPS_{it}$ is the book value of equity per share for financial firm i at the end of fiscal year t . EPS_{it} is the reported net income per share of financial firm i for the fiscal year t , and D_t is a year dummy variable for fiscal year t . This model has been extensively employed in the accounting literature to measure the value relevance of accounting information (e.g. Collins et al., 1997; Bartov et al., 2005; Barth et al., 2008; Balachandran and Mohanram, 2011; Shen and Stark, 2013; Venter et al., 2014).

The valuation coefficients on the components of book value of equity are expected to be in the region of one (this issue is discussed further in Section 3.2.3). This is particularly the case for level 1 fair values and to large extent for level 2 fair values. If the reported level 1 and level 2 fair values accurately capture their underlying economic values, investors are likely to allocate euro-for-euro value to these amounts. For level 3 fair values and non-fair value items, based on the degree of subjectivity, and thus reliability concerns, associated with these amounts, coefficients are expected to deviate from one. Due to efficiency concerns in some of the markets in the countries under investigation, this thesis does not test the variation in the valuation coefficients on accounting numbers from its theoretical benchmark (as pointed out in the limitations of the thesis in Section 6.5).

The main objective is to examine the value relevance of the three levels of fair value amounts. Therefore, the book value of equity is decomposed into fair value and non-fair value components as follows:

$$P_{it} = b_0 + b_1NFVNA_{it} + b_2FVNA1_{it} + b_3FVNA2_{it} + b_4FVNA3_{it} + b_5EPS_{it} \quad (3.18)$$

$$+ \delta D_t + \varepsilon_{it}$$

where $NFVNA_{it}$ is the non-fair value net assets for firm i as reported at the end of fiscal year t . Simply put, $NFVA_{it}$ is the difference between book value of equity and net assets measured at

⁷² Similar to the first part, as a robustness check in Section 5.5, six months market value of equity is used as a dependent variable.

fair value. $FVNA1_{it}$ ($FVNA2_{it}$, $FVNA3_{it}$) are level 1 (level 2, level 3) fair value net assets for firm i as reported at the end of fiscal year t . Due to lower frequency of liabilities at fair value, this study uses fair value net assets rather than addressing fair value assets and fair value liabilities separately (Kolev, 2009). All the variables are scaled by the number of shares. Since the aim is to examine the value relevance of fair value hierarchy, the focus is on the coefficients of the three levels of fair value net assets (i.e. b_2 , b_3 , and b_4). If investors consider level 1 fair value amounts to be more reliable and thus more value relevant than level 3 fair values, b_2 are expected to be greater in magnitude than b_4 . The estimated coefficient on level 2 fair values, b_3 , is predicted to fall, in magnitude, between the coefficients on level 1 and level 3. b_1 and b_5 are the valuation coefficients on non-fair value net assets and reported net income, respectively. Given the relatively short time span of the data, only four years of fair value hierarchy disclosure, as well as the unbalanced sample of financial firms,⁷³ this study uses pooled OLS regression in investigating the value relevance of fair value hierarchy.

It is worth mentioning that the assumption of market efficiency becomes necessary when value relevance research tests whether the pricing coefficients on accounting numbers differ from theoretical benchmarks (Barth et al., 2011). This has an important implication for the present study, given the doubts concerning the efficiency of some European markets, as well as the potential effect of the variation in market efficiency across European countries on the estimated coefficients (Aboody et al., 2002; Hellström, 2006; Dobija and Klimczak et al., 2010; Aharony et al., 2010). Therefore, this study does not derive theoretical benchmarks for the valuation coefficients on fair value amounts, and neither does it examine their deviations from any theoretical values.

⁷³ For some years in the study, there are firms with no readily available reports and/or no disclosure on IFRS 7, as well as firms being listed or delisted during the study period (see Section 3.3.3).

The second hypothesis examines whether the institutional environment has an impact on the value relevance of fair value hierarchy. Country-level variables are introduced to the model as follows:

$$P_{it} = b_0 + b_1NFVNA_{it} + b_2FVNA1_{it} + b_3FVNA2_{it} + b_4FVNA3_{it} + b_5INSRANK * FVNA1_{it} + b_6INSRANK * FVNA2_{it} + b_7INSRANK * FVNA3_{it} + b_8EPS_{it} + b_9INSRANK + \delta D_t + \varepsilon_{it} \quad (3.19)$$

INSRANK is a constructed variable to proxy for the strength of institutional environment at country level. Similar to Part I in this chapter, five country-specific measures are employed, namely, *Efficacy of corporate boards*, *Strength of auditing and reporting*, *Protection of minority shareholders' interests*, *Regulation of securities exchanges*, and *judicial independence*. The data for these measures are extracted from the annual Global Competitiveness Report issued by World Economic Forum over the period 2009-2012.⁷⁴ Based on the principle component factor analysis of the institutional variables, a standardised institutional environment score (*INSSCORE*) is created.

Previous accounting studies follow this approach to capture country-specific characteristics (e.g. Nobes, 2011; Nobes and Stadler, 2013). Then, the institutional environment score (*INSSCORE*) is rank-transformed into decile rank (*INSRANK*) ranging from 0, which represents the strong institutional environment (high values of *INSSCORE*) to 9, associated with weak institutional environment (low values of *INSSCORE*). Since information asymmetry and measurement errors are likely to be more associated with level 3 fair values than with level 1 and level 2 fair values, this study predicts that country-specific institutional characteristic will affect more the value relevance of mark-to-model fair value amounts (i.e. level 3 fair values). Compared to level 1 and 2 fair values (b_5 and b_6), the valuation coefficient on the interaction between institutional environment (*INSRANK*) and level 3 fair values, b_7 , is expected to be greater in absolute value⁷⁵

⁷⁴ Section 3.2.4 discussed further the selected institutional environment measures and their expected impact on the value relevance of accounting information.

⁷⁵ The coefficient on the interaction between *INSRANK* and fair values is expected to be negative since *INSRANK* ranges from 0 (strong institutional environment) to 9 (weak institutional environment).

and more significant. In this version of the model, the estimated coefficients on fair values (i.e. b_2 , b_3 and b_4) can be interpreted as the valuation coefficients of fair values reported by firms in countries with strong institutional business environment. The coefficient on *INSRANK*, b_9 , shows the association between institutional environment and firms' market value. The remaining coefficients are as previously defined.

In addition to the country-level institutional environment, this study analyses whether the value relevance of fair value hierarchy varies with corporate governance mechanisms. The firm-level corporate governance measures are incorporated in the main model:

$$\begin{aligned}
 P_{it} = & b_0 + b_1NFVNA_{it} + b_2FVNA1_{it} + b_3FVNA2_{it} + b_4FVNA3_{it} + & (3.20) \\
 & b_5GOVRANK * FVNA1_{it} + b_6GOVRANK * FVNA2_{it} + b_7GOVRANK * \\
 & FVNA3_{it} + b_8EPS_{it} + b_9GOVRANK + \delta D_t + \varepsilon_{it}
 \end{aligned}$$

Again, similar to Part I in this chapter, *GOVRANK* is a decile rank measure based on five firm-specific corporate governance variables: *Board meeting*, *Audit size*, *Audit meeting*, *No of block* and *Audit fee*. Governance data are collected from the firms' financial annual reports and/or corporate governance reports over the period 2009-2012. Using the principal-component factor analysis, a standardised corporate governance score (*GOVSCORE*) is regressed on country dummy variables (*COUNTRY*) to filter out the country effect on corporate governance quality (see, Verriest et al., 2013), as follows:

$$GOVSCORE_i = a_0 + \sum b_n COUNTRY_n + \varepsilon_i \quad (3.21)$$

The residual estimated from the above regression (*GOVRANK*) is considered as a measure of firm-level corporate governance after filtering out country-level variation. Again it ranges from 0, for firms with strong corporate governance, to 9, representing firms with weak corporate governances, and then scaled by 9. Corporate governance is expected to play a vital role in mitigating the information asymmetry problem associated with mark-to-model fair value amounts. In contrast, corporate governance practices are less likely to play a significant role in

determining the reliability of fair value amounts based on observable market inputs (i.e. level 1 and level 2 fair values). Hence, the coefficient on the interaction between firm-level corporate governance and level 3 fair values, b_7 , is predicted to be greater in absolute value and more significant, in comparison to level 1 and 2 fair values (b_5 and b_6). b_2 , b_3 and b_4 can be deemed as the valuation coefficients of fair values reported by firms with strong corporate governance. The increment to the intercept, b_9 , shows the association between corporate governance and market value of equity. The rest of the coefficients were defined previously.

Two additional analyses are run through partitioning the sample by firm size and bank's Tier 1 capital ratio. Firstly, the value relevance of the three levels of fair value are examined after splitting the sample into: small and large firms, based on the sample median of total assets. Secondly, the banks in the sample are divided into two groups: low and high Tier 1 ratio banks to test the value relevance of fair values.

3.3.3 Sample selection procedures

The disclosure of the fair value hierarchy is not specific to any particular industry; yet financial sector firms tend to hold a considerable percentage of their assets and liabilities measured at fair value. Thus, the present study focuses on financial firms that are likely to provide a more comprehensive disclosure of fair value hierarchy under IFRS 7, compared to other industries. The sample period starts in 2009 since fair value hierarchy disclosure under IFRS 7 is mandated for the fiscal years beginning on or after 1 January 2009. Due to data availability at the time of this study, the sample period ends in 2012. Table 3.5 presents the sample selection procedures with the corresponding number of observations at each stage. The BankScope database (by Bureau van Dijk) is used to identify the initial sample of listed financial firms in the EEA and Switzerland. The initial sample comprises 988 firm-year observations related to financial firms that prepare their financial statements under IFRS. Market and accounting data are drawn from Datastream. Data on fair value hierarchy disclosure are hand-collected from firms' annual reports

over the period 2009-2012, given that this information on EEA and Swiss firms is not available in databases. To this end, annual reports are downloaded from the firms' websites and/or Thomson One Banker. The study excludes 209 observations for which annual reports were not available, or at least they were not available in English. In addition, observations related to firms that provided no disclosure or insufficient disclosure on fair value hierarchy are excluded from the sample (40 observations). Finally, 40 observations with no market data in Datastream are dropped from the sample. These procedures yield a final sample of 699 financial firm-year observations to test the first hypothesis on the value relevance of fair value hierarchy as well as the second hypothesis regarding the impact of the institutional business environment.

In order to test third hypothesis that addresses the impact of corporate governance mechanisms, corporate governance data are hand collected from firms' annual reports and/or corporate governance reports over the period 2009-2012. A further 160 observations were excluded due to missing or incomplete governance data. This left a final sample of 539 firm-year observations to test the impact of corporate governance on the value relevance of fair value hierarchy.

Table 3. 5 Sample selection procedures

	2009	2010	2011	2012	Firm-year observations
All financial firms that are listed in the EEA and Switzerland over 2009-2012 and use IFRS	238	250	254	246	988
Exclude firms without readily available reports and those without reports in English	(54)	(56)	(52)	(47)	(209)
Exclude firms with no data on IFRS 7	(13)	(9)	(9)	(9)	(40)
Exclude firms with no market data in the databases	(8)	(9)	(11)	(12)	(40)
The main sample	163	176	182	178	699
No corporate governance data	(36)	(40)	(43)	(41)	(160)
The corporate governance sample	127	136	139	137	539

The final sample of 699 firm-year observations related to 185 financial firms listed in the EEA countries and Switzerland. In Table 3.6, Panel A reports the country breakdown of the sample firms as well as the country distribution of observations. Column B outlines the corresponding distribution of firms and observations to test *H3B* addressing the impact of corporate governance.

As presented in Column A, UK has the largest number of firms in the sample (29 firms), with a total of 108 firm-year observations. Italy and Switzerland follow with 20 and 13 firms (79 and 51 firm-year observations), respectively. At the other extreme, Bulgaria, Hungary, Ireland and Lithuania have 7, 5, 8 and 5 firm-year observations, respectively, related to two financial firms in each country.

For the third hypothesis requiring data on firm-level corporate governance, Panel B in Table 3.6 shows that the sample consists of 539 observations from 140 firms listed in 23 countries. UK and Italy have the largest number of financial firms in the sample, 27 and 14 firms (102 and 56 firm-year observations), respectively. At the other end of the spectrum, two countries are represented by one financial firm (and 4 firm-year observations), namely Romania and Slovakia.

Table 3. 6 Country breakdown

Country	(A) Entire Sample			(B) Corporate Governance Sample		
	Firms	Obs	Percent	Firms	Obs	Percent
Austria	6	22	3.15	6	22	4.08
Belgium	4	15	2.15	4	15	2.78
Bulgaria	2	7	1.00	-	-	-
Cyprus	3	11	1.57	3	11	2.04
Denmark	9	34	4.86	5	18	3.34
Finland	5	20	2.86	4	16	2.97
France	9	34	4.86	8	30	5.57
Germany	11	43	6.15	10	39	7.24
Greece	7	26	3.72	2	8	1.48
Hungary	2	5	0.72	-	-	-
Ireland	2	8	1.14	2	8	1.48
Italy	20	79	11.3	14	56	10.39
Lithuania	2	5	0.72	-	-	-
Luxemburg	3	12	1.72	2	8	1.48
Malta	3	12	1.72	3	12	2.23
Netherland	6	24	3.43	5	20	3.71
Norway	11	42	6.01	8	31	5.75
Poland	12	46	6.58	6	24	4.45
Portugal	3	12	1.72	3	12	2.23
Romania	3	12	1.72	1	4	0.74
Slovakia	4	11	1.57	1	4	0.74
Slovenia	3	12	1.72	2	8	1.48
Spain	7	24	3.43	6	20	3.71
Sweden	6	24	3.43	6	24	4.45
Switzerland	13	51	7.3	12	47	8.72
UK	29	108	15.45	27	102	18.92
Total	185	699	100	140	539	100

3.4 Conclusions

This chapter is divided into two main parts corresponding to the two empirical parts of the study. Part I presents the research methodology to assess the impact of IFRS adoption and of the financial crisis on the value relevance of accounting information. Part I starts with the development of four hypotheses to be tested. The first hypothesis concerns the impact of IFRS adoption on the value relevance of accounting information. The second hypothesis addresses the change in the value relevance of the book value of equity and earnings when the financial crisis hit. The third and fourth hypotheses are formed to evaluate the impact of the institutional environment and of corporate governance, respectively, on the value relevance of equity book value and earnings during the financial crisis. The study employs the price model proposed by Ohlson (1995) to test the value relevance. In this model, the market value of equity is regressed

on the book value of equity and earnings. Firstly, the explanatory power of the price model is used to test whether there has been any change in the value relevance of accounting information as a result of IFRS adoption. Secondly, a crisis dummy variable is interacted in the price model to evaluate the impact of the financial crisis on the valuation roles of the book value of equity and earnings. Additionally, the role of the institutional environment and that of corporate governance are examined after interaction with the valuation of equity book value and earnings during the crisis period. Finally, the sample selection procedures and the distribution of observations throughout the period covered by the study and across countries are presented.

Part II of this chapter presents the research methodology employed to evaluate the value relevance of fair value hierarchy as disclosed under IFRS 7. The first hypothesis to be tested concerns the value relevance of the three levels of fair value hierarchy. The second and third hypotheses address the value relevance of fair value hierarchy as a function of the institutional environment and of firm-level corporate governance mechanisms, respectively. As in Part I, the price model is used as the baseline regression to test the value relevance of fair values. More specifically, the market value of equity is regressed on the three levels of fair values in addition to non-fair value net assets and net income. The following models include the interaction between the institutional environment as well as corporate governance measures, on one hand, and the three levels of fair value on the other. The final section presents the sample selection procedures in addition to firm and observations distribution across the countries under study.

The next two chapters present and discuss the empirical findings which obtained from testing the hypotheses stated in Part I and Part II of this chapter.

Chapter 4: Findings and Discussion on the Impact of IFRS and the Crisis on Value Relevance

4.1 Introduction

This chapter provides the first part of the empirical findings derived from testing the hypotheses developed in Part I in the previous chapter. It shows and discusses the findings on the impact of IFRS adoption and the financial crisis on the value relevance of accounting information. The chapter is structured as follows. Section 4.2 offers the descriptive statistics of the variables used in the empirical tests. Section 4.3 presents as well as discusses the empirical results on testing the changes in the value relevance of accounting information following IFRS adoption. Then, the findings on the impact of the crisis period (2008-2012) on the value relevance of equity book value and earnings are presented and discussed in Section 4.4. Section 4.5 presents the impact of the institutional environment and corporate governance mechanisms on the value relevance of book value of equity and net income during the crisis period. Section 4.6 presents the additional analyses and robustness checks performed. Finally, Section 4.7 concludes the chapter.

4.2 Descriptive statistics

Table 4.1 reports the descriptive statistics on accounting and market variables used to test the first hypothesis (*H1A*) on the impact of IFRS adoption on the value relevance of accounting information. The entire study period is divided into two phases, pre-IFRS adoption (1998-2004) and IFRS adoption (2005-2012). Panel A reports the descriptive statistics for the whole sample of financial firms (including banks), while Panel B shows the corresponding statistics for the subsample of banks. To mitigate the effects of outliers, all variables are winsorised at the 1st and 99th percentiles.

Table 4. 1 Descriptive statistics: pre-IFRS adoption and IFRS adoption**Panel A Price model variables for financial firms over two periods, pre-IFRS adoption (1998-2004) and IFRS adoption (2005-2012) as well as the entire study period (1998-2012)**

	<i>P</i>				<i>BVPS</i>				<i>EPS</i>			
	Entire	Pre – IFR	IFRS	diff	Entire	Pre – IFR	IFRS	diff	Entire	Pre – IFR	IFRS	diff
Mean (€)	37.50	50.82	26.55	***	85.64	80.23	90.09	-	6.66	6.90	6.47	-
Std. Dev	102.06	142.92	43.92		264.22	240.42	282.30		20.05	19.73	20.31	
Coefficient of Variation	2.72	2.81	1.65		3.09	3.00	3.13		3.01	2.86	3.14	
P25	4.73	7.47	3.56		3.42	3.71	3.28		0.22	0.33	0.15	
Median	13.55	16.10	10.19	***	9.44	10.65	8.77	***	0.90	1.08	0.79	***
P75	33.53	47.07	26.25		28.04	36.61	23.65		3.01	3.86	2.43	
<u>Obs</u>	<u>2799</u>	<u>1263</u>	<u>1536</u>		<u>2799</u>	<u>1263</u>	<u>1536</u>		<u>2799</u>	<u>1263</u>	<u>1536</u>	

Panel B Price model variables for banks over two periods, pre-IFRS (1998-2004) and IFRS adoption (2005-2012) as well as the entire study period (1998-2012)

	<i>P</i>				<i>BVPS</i>				<i>EPS</i>			
	Entire	Pre – IFR	IFRS	diff	Entire	Pre – IFR	IFRS	diff	Entire	Pre – IFR	IFRS	diff
Mean (€)	34.05	41.28	28.10	***	97.35	81.45	110.45	**	7.42	7.00	7.76	-
Std. Dev	56.86	68.87	43.73		277.90	224.77	314.54		20.39	17.95	22.20	
Coefficient of Variation	1.67	1.67	1.56		2.85	2.76	2.85		2.75	2.56	2.86	
P25	5.35	0.30	0.03		4.07	4.06	4.10		0.29	0.44	0.20	
Median	14.69	17.68	11.65	***	10.82	11.76	9.74	**	1.08	1.25	0.90	***
P75	39.39	636.0	260.0		35.52	44.00	27.40		3.53	4.64	2.84	
<u>Obs</u>	<u>2131</u>	<u>963</u>	<u>1168</u>		<u>2131</u>	<u>963</u>	<u>1168</u>		<u>2131</u>	<u>963</u>	<u>1168</u>	

Notes: *P* is the market value per share of firm three months following the end of the fiscal year. *BVPS* is the book value of equity per share for firm at the end of the fiscal year. *EPS* is the reported earnings per share of firm over the fiscal year. * significant at 10%, ** significant at 5%, and *** significant at 1%. The differences in means between pre-IFRS adoption and IFRS adoption periods are tested using two sample t-test.⁷⁶ The differences in medians are tested by 'Wilcoxon signed rank test'.

Compared to the period of pre-IFRS adoption, the market value per share tends to be lower over IFRS adoption period. For the main sample of financial firms, the mean of market value per share (*P*) is €50.82 before IFRS adoption and €26.55 after the mandatory introduction of IFRS, and the difference is statistically significant. The sub-sample of banks shows a similar pattern in terms of market value per share.

The mean of book value of equity per share (*BVPS*) increases from €80.23 (€81.45) before IFRS adoption to €90.09 (€110.45) over the period of IFRS for the whole sample (the sub-sample of banks), and the difference is statistically significant only for the sub-sample of banks. However,

⁷⁶ Since the panels are unbalanced, t test is used for the difference in the means for independent samples. As a further check, paired-samples t-test is used to test the difference between the means between 2004 and 2005 amounts (implying that the observations from the two periods are not independent) and results remain substantially unaltered.

the median shows a significant decrease in the book value of equity after IFRS adoption for the both the entire sample of financial firms and the sub-sample of banks.

For the whole sample of financial firms, the mean of earnings per share (*EPS*) decreases from €6.90 before IFRS adoption to €6.47 over the period of mandatory IFRS adoption, however, the difference is not statistically significant. In contrast, the sub-sample of banks has a higher mean of earnings per share after IFRS adoption, but the difference is not significant. The medians of earnings per share for both the whole sample and the sub-sample show a significant decrease after mandatory IFRS adoption. The decrease in market value and profitability is probably driven by the financial crisis during the period of IFRS adoption.

The descriptive statistics show that the coefficients of variation⁷⁷ for the accounting variables have increased after IFRS adoption. For the whole sample, the coefficient of variation of equity book value (earnings) per share increases from 3 (2.86) over the pre-IFRS adoption period to 3.13 (3.14) during the period of IFRS implementation. A similar pattern is shown for the sub-sample of banks, indicating an increase in the volatility around the mean for accounting numbers in the period of IFRS adoption. This is in line with the view that the adoption of fair value-oriented accounting standards, such as IFRS, results in more volatile accounting figures, especially net income⁷⁸ (Ball, 2006; Hung and Subramanyam, 2007; Karampinis and Hevas, 2011). Arguably, the high volatility of accounting variables might be related to the crisis during the period of IFRS adoption.

The second hypothesis is about the impact of the financial crisis on the value relevance of book value of equity and net income reported under IFRS. In this context, Table 4.2 reports the

⁷⁷ The coefficient of variation is used to measure the volatility of accounting figures. Prior literature suggests that the volatility of accounting numbers has an impact on the valuation of book value of equity and earnings (see, for example, Collins et al., 1997; Hung and Subramanyam, 2007; Tsalavoutas et al., 2012).

⁷⁸ This is particularly true if the measurement error associated with assets' fair value, especially for those with no active market, is not fully offset by the measurement errors of liabilities' fair value (Landsman, 2007).

descriptive statistics on accounting and market variables where IFRS adoption period is divided into pre-crisis period (2005-2007) and crisis period (2008-2012). Panel A presents the descriptive statistics for the whole sample of financial firms. The mean and median of market value per share (*P*) appear to be significantly lower over the period of financial crisis relative to pre-crisis period. Likewise, the medians of book value of equity (*BVPS*) and earnings (*EPS*) per share are significantly lower in the financial crisis period. The means of book value of equity and earnings per share decrease during the crisis period, however, this decrease is only statistically significant for earnings.

Table 4. 2 Descriptive statistics: pre-crisis and the financial crisis
Panel A Price model variables for financial firms over two periods, pre-financial crisis (2005-2007) and the financial crisis (2008-2012), as well as IFRS adoption (2005-2012)

	<i>P</i>				<i>BVPS</i>				<i>EPS</i>			
	IFRS	Pre – Crisis	Crisis	diff	IFRS	Pre – Crisis	Crisis	diff	IFRS	Pre – Crisis	Crisis	diff
Mean	26.55	41.70	17.30	***	90.09	101.77	82.96	-	6.47	8.81	5.04	***
Std. Dev	43.92	59.09	27.43		282.30	300.91	270.24		20.31	22.59	18.66	
Coefficient of Variation	1.65	1.42	1.59		3.13	2.96	3.26		3.14	2.56	3.70	
P25	3.56	8.14	2.36		3.28	4.21	2.73		0.15	0.56	0.02	
Median	10.19	18.40	6.38	***	8.77	10.78	7.44	***	0.79	1.52	0.47	***
P75	26.25	44.60	18.51		23.65	25.59	22.23		2.43	3.79	1.57	
Obs	1536	582	954		1536	582	954		1536	582	954	

Panel B Value relevance model variables for banks over two periods, pre-financial crisis (2005-2007) and the financial crisis (2008-2012), as well as IFRS adoption (2005-2012)

	<i>P</i>				<i>BVPS</i>				<i>EPS</i>			
	IFRS	Pre – Crisis	Crisis	diff	IFRS	Pre – Crisis	Crisis	diff	IFRS	Pre – Crisis	Crisis	diff
Mean	28.10	43.58	18.60	***	110.45	118.74	105.37	-	7.76	9.87	6.47	**
Std. Dev	43.73	57.39	28.82		314.54	327.12	306.68		22.20	23.63	21.18	
Coefficient of Variation	1.56	1.32	1.55		2.85	2.75	2.91		2.86	2.39	3.27	
P25	0.03	10.23	2.43		4.10	5.22	3.38		0.20	0.78	0.03	
Median	11.65	20.54	6.69	***	9.74	11.84	8.75	***	0.90	1.69	0.51	***
P75	260.0	49.93	20.35		27.40	30.10	26.57		2.84	4.82	1.93	
Obs	1168	444	724		1168	444	724		1168	444	724	

Notes: The variables are defined in the notes of Table 4.1. * significant at 10%, ** significant at 5%, and *** significant at 1%. The differences in means between pre-IFRS adoption and IFRS adoption periods are tested using two sample t-test.⁷⁹ The differences in medians are tested by ‘Wilcoxon signed rank test’.

The descriptive statistics in Panel B for the sub-sample of banks are consistent with those of the whole sample of financial firms. That is, when the financial crisis hits the economies of the

⁷⁹ Since the panels are unbalanced, t test is used for the difference in the means for independent samples. As a further check, paired-samples t-test is used to test the difference between the means between 2007 and 2008 amounts (implying that the observations from the two periods are not independent) and results remain substantially unaltered.

countries under study, financial firms suffered reduced profitability and lower market value of equity.

The dispersion around the mean, measured by the coefficient of variation, is higher during the crisis period for all the variables. Interestingly, the variation around the mean tends to increase by a greater extent for earnings (from 2.56 to 3.70 for the main sample) in comparison to book value of equity (from 2.96 to 3.26 for the main sample). This must be taken into account in evaluating the impact of financial crisis on the value relevance of book value of equity and earnings. The same pattern of higher coefficient of variation during the crisis period can be observed in Panel B for the sub-sample of banks.

Country-level variables are presented in Table 4.3, the data are drawn from the annual Global Competitiveness Reports issued by World Economic Forum. The country-level measures include: *Efficacy of corporate boards*, *Strength of auditing and reporting standards*, *Protection of minority interests*, *Regulation of securities exchanges*, and *Judicial independence*. These measures are coded on a scale from 1 to 7, where a value of 1 is associated with weak institutional environment and 7 indicates a strong institutional setting. This research aims to investigate the changes in the value relevance of the balance sheet and the income statement as a function of institutional factors during the crisis period. To this end, the means of institutional environment measures for each country over the financial crisis period are used (i.e. the means of five years 2008-2012).

As presented in Table 4.3, three Nordic countries have the highest score in the measure of *Efficacy of corporate boards*. Sweden (5.88), followed by Norway (5.56) and Finland (5.54) have highly efficient corporate boards. At the other extreme, Greece (3.98), Italy (4.00), Poland (4.36) and Portugal (4.36) have the lowest scores.

Table 4. 3 Institutional factors (average values) over 2008-2012

Country	<i>Efficacy of corporate boards</i>	<i>Strength of auditing & reporting</i>	<i>Protection of minority interests</i>	<i>Regulation of securities exchanges</i>	<i>Judicial independence</i>
Austria	5.26	5.86	5.16	5.04	5.80
Belgium	5.17	5.70	5.10	5.13	5.29
Denmark	5.40	5.72	5.50	5.60	6.40
Finland	5.54	6.20	5.94	5.80	6.42
France	5.16	5.62	4.82	5.38	4.94
Germany	5.32	5.50	5.28	5.10	6.12
Greece	3.98	4.70	4.78	4.34	3.54
Iceland	4.88	5.04	4.52	4.46	5.82
Ireland	4.80	4.94	4.90	4.52	6.64
Italy	4.00	4.24	3.66	4.28	3.74
Luxemburg	5.28	5.88	5.14	5.78	5.94
Netherland	5.40	5.94	5.32	5.42	6.36
Norway	5.56	6.02	5.76	5.82	6.22
Poland	4.36	4.98	4.18	4.96	4.08
Portugal	4.36	4.98	4.60	4.94	4.40
Spain	4.50	4.92	4.32	4.02	3.92
Sweden	5.88	6.18	6.00	5.92	6.40
Switzerland	5.34	5.70	4.92	5.70	6.36
UK	5.38	5.92	5.32	5.20	6.12

Source: Global Competitiveness Report 2008 – 2012 issued by World Economic Forum.

Notes: *Efficacy of corporate boards* measures how corporate governance is characterised by investors and boards of directors in a country [1 = management has little accountability to investors and boards; 7 = investors and boards exert strong supervision of management decisions). *Strength of auditing and reporting standards* measures how financial auditing and reporting standards is assessed regarding company financial performance [1 = extremely weak; 7 = extremely strong]. *Protection of minority interests* assess to what extent the interests of minority shareholders are protected by the legal system [1 = not protected at all; 7 = fully protected]. *Regulation of securities exchanges* is an assessment for the regulation and supervision of securities exchanges [1 = ineffective; 7 = effective]. *Judicial independence* measures to what extent the judiciary is independent from influences of members of government, citizens, or firms [1 = heavily influenced; 7 = entirely independent].

In terms of *Strength of auditing and reporting standards*, Finland (6.20), Sweden (6.18) and Norway (6.02) have the highest scores, while Italy (4.24), Greece (4.7) and Spain (4.92) are at the other end of the scale with the lowest scores. Sweden (6), Finland (5.94), and Norway (5.67) seem to have the strongest *Protection of minority interest*, whereas Italy (3.66), Spain (4.32) and Poland (4.18) have the weakest minority shareholders interest protection. For *Regulation of securities exchanges*, Sweden (5.92), Norway (5.82) and Finland (5.8) have the highest scores. On the other hand, Greece (4.34), Italy (4.28) and Spain (4.02) are associated with the lowest scores. Finally, Ireland (6.64), Finland (6.42), Denmark and Sweden (6.4) have the most independent judiciary from influences of members of government, citizens and firms (*Judicial independence*). At the other extreme, Spain (3.92), Italy (3.74) and Greece (3.54) have the least

independent judiciary. In sum, Sweden, Finland and Norway report high scores in most of country-level variables used, whereas Greece, Spain and Italy typically have the lowest scores.

Table 4.4 reports the descriptive statistics for the firm-level corporate governance variables presented as averages over the period 2008-2012. Corporate governance data are collected from annual reports and/or corporate governance reports. Firstly, for the whole sample of financial firms, the mean of board meetings per year (*Board meeting*) is 11.36, ranging from a minimum of 3.50 to a maximum of 26.50 meetings. The second firm-specific variable is the audit committee size (*Audit size*), which is the total numbers of directors who serve on the audit committee. The mean of audit committee size is 4.09 members and it ranges from 2 to 7.60 members. The mean of audit committee meetings per year (*Audit meeting*) is 6.78 meetings with a minimum of 1 meeting and maximum of 23.60 meetings. The number of blockholders (*No of block*) is the number of shareholders who hold more than 5% of voting rights, as reported by firms. The average number of blockholders is 2.26 ranging from 0 to 6.75 blockholders. Finally, the mean of annual audit fees paid to external auditors (*Audit fee*) is €7,261.2 (in thousands), ranging from a minimum of €0.82 to a maximum of €74,452.50. In the principle component analysis (described below) the natural logarithm of audit fees is used. Overall, these figures are consistent with previous studies focusing on European firms as well as on non-European firms (e.g., Goodwin-Stewart and Kent, 2006; Erkens et al., 2012; Essen et al., 2013; Barakat and Hussainey, 2013). The sub-sample of banks reveals higher score for firm-level corporate governance variables except for *No of block* (i.e. the number of shareholders holding 5% or more of voting rights). The mean of *Board meeting* is 12.55, with a minimum value of 3.50 and a maximum of 26.50 meetings. The mean of *Audit size* is 4.20. Similarly to the whole sample, it ranges from 2 to 7.60 directors. The mean value of *Audit fee* is 9206.6, ranging from €0.82 to €74452.5 (in thousands). Compared to the whole sample of financial firms, the sub-sample of banks has lower *No of Block* with a mean of 2.12 and a range from 0 to 6.75.

Table 4. 4 Descriptive statistics on corporate governance variables

	Panel A Financial Firms (incl. Banks)					Panel B Banks (only)				
	<i>Board meeting</i>	<i>Audit size</i>	<i>Audit meeting</i>	<i>No of block</i>	<i>Audit fee</i>	<i>Board meeting</i>	<i>Audit size</i>	<i>Audit meeting</i>	<i>No of block</i>	<i>Audit fee</i>
Mean	11.36	4.09	6.78	2.26	7261.2	12.55	4.20	7.79	2.12	9206.6
Std. Dev	5.06	1.07	4.01	1.36	14301.3	5.44	1.16	4.24	1.38	16005.9
Min	3.50	2.00	1.00	0.00	0.82	3.50	2.00	1.80	0.00	0.82
P25	7.60	3.20	4.00	1.20	351.6	8.00	3.00	4.60	1.00	491.3
Median	10.80	4.00	5.60	2.00	1199.5	11.80	4.00	7.00	2.00	1532.5
P75	14.50	4.80	8.25	3.20	4210.8	16.20	5.00	10.80	3.00	6852.7
Max	26.50	7.60	23.60	6.75	74452.5	26.50	7.60	23.60	6.75	74452.5
N	470	470	470	470	470	320	320	320	320	320

Notes: *Board meeting* is the number of annual board meetings. *Audit size* is the total numbers of directors who serve on the audit committee. *Audit meeting* is the number of annual audit committee meetings. *No of block* is the number of shareholders who hold more than 5% voting rights. *Audit fee* is the audit fees paid by a firm to external auditors, presented in thousands of euros. All the variables are the average of its annual values over the period 2008-2012.

Table 4.5 presents the summary descriptive statistics on corporate governance variables as averages over the period 2008-2012 grouped by country. In both Panels A and B, the data shows a large cross-country variation in terms of corporate governance characteristics. For instance, in the whole sample of financial firms Greece and Ireland have the highest *Board meeting*, 20.92 and 16.2 meetings respectively, in comparison to less than 5 meetings per year in Austria and Switzerland. Finland, Luxemburg and Sweden have around 3 directors serving in audit committee in average, whereas the number reaches more than five members in Greece, Belgium and Austria. For *Audit meeting*, Table 4.5 shows the lowest *Board meeting* in Germany (4), Switzerland (3.1) and Austria (1.9). At the other extreme, Portugal (12.33), Ireland (11.7) and Italy (10.85) reveal the highest number of *Audit meeting*. The financial firms in Greece, Italy, and Poland has less than 1.5 blockholders in average over the period (2008-2012), while those in Belgium, Netherland and Australia show an ownership structure with more than 3 blockholders. Finally in terms of *Audit fee*, Finland, Poland and Austria have the lowest fees, while France, Spain and Netherland show the highest audit fees paid. The descriptive statistics for the sub-sample of banks are very similar to those of the whole sample of financial firms. This variation across countries in relation to corporate governance practices is consistent with the variation in the institutional factors, such as market regulation and judicial independence.

Table 4. 5 Descriptive statistics of corporate governance variables by country
Panel A Financial Firms (inc. Banks)

Country	<i>Board meeting</i>		<i>Audit size</i>		<i>Audit meeting</i>		<i>No of block</i>		<i>Audit fee</i>		N
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	
Austria	4.00	0.00	7.18	0.44	1.90	0.10	3.50	0.52	382.5	134.4	10
Belgium	15.69	1.65	5.27	1.03	7.60	0.00	5.08	0.31	10953.3	4230.3	9
Denmark	13.20	2.76	3.48	0.53	4.28	0.39	1.73	0.59	1273.2	1260.9	15
Finland	14.85	4.85	2.90	0.58	6.67	4.87	2.45	0.58	741.9	831.2	20
France	8.84	3.21	4.51	1.36	5.58	3.68	2.62	1.85	25905.5	24490.9	40
Germany	6.00	1.03	4.30	0.31	4.00	1.45	1.50	0.31	2620.0	1941.7	10
Greece	20.92	4.79	5.13	0.13	10.25	0.26	0.40	0.42	3516.1	484.8	6
Ireland	16.20	5.58	5.00	0.41	11.70	1.96	2.00	1.45	5370.0	2798.9	10
Italy	14.94	4.69	4.05	1.09	10.85	5.29	1.29	1.17	4443.2	9203.6	70
Luxemburg	6.13	1.16	2.90	0.10	4.80	1.03	2.20	0.21	3141.9	2006.1	10
Netherland	9.40	1.42	4.20	0.96	4.70	0.84	3.85	1.85	12000.6	19477.9	20
Norway	14.89	3.24	3.22	0.34	6.73	1.53	1.61	0.49	847.3	980.7	35
Poland	6.27	1.80	4.57	0.54	4.33	0.69	1.36	0.31	570.2	314.4	30
Portugal	10.00	1.80	3.80	0.67	12.33	3.31	2.93	0.75	3366.7	1353.9	15
Spain	13.90	1.59	4.75	0.46	10.25	2.73	2.90	0.91	15352.5	16320.7	20
Sweden	14.77	3.05	3.10	0.10	5.20	1.48	2.37	0.41	1834.9	2045.1	30
Switzerland	4.80	0.62	4.40	0.62	3.10	0.93	1.50	0.52	3349.7	750.8	10
UK	9.30	4.12	4.12	0.74	5.55	2.57	2.66	1.25	9710.5	16673.6	110
Total	11.36	5.06	4.094	1.07	6.780	4.01	2.263	1.36	7261.2	14301.4	470

Panel B Banks (only)

Country	<i>Board meeting</i>		<i>Audit size</i>		<i>Audit meeting</i>		<i>No of block</i>		<i>Audit fee</i>		N
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	
Austria	4.00	0.00	7.18	0.44	1.90	0.10	3.50	0.52	382.4	134.5	10
Belgium	15.69	1.65	5.27	1.03	7.60	0.00	5.08	0.31	10953.2	4230.3	9
Denmark	13.20	2.76	3.48	0.53	4.28	0.39	1.73	0.59	1273.1	1260.9	15
Finland	19.50	1.55	3.00	0.00	10.13	4.68	2.90	0.52	403.8	36.1	10
France	8.45	3.44	4.65	1.45	6.68	3.64	2.33	2.03	34032.2	23100.1	30
Germany	5.00	0.00	4.60	0.00	2.60	0.00	1.80	0.00	740.0	0.00	5
Greece	20.92	4.79	5.13	0.13	10.25	0.26	0.40	0.42	3516.1	484.8	6
Ireland	16.20	5.58	5.00	0.41	11.70	1.96	2.00	1.45	5370.0	2798.9	10
Italy	15.71	4.58	4.11	1.16	11.48	5.41	1.20	1.24	5071.9	9805.6	60
Luxemburg	6.13	1.16	2.90	0.10	4.80	1.03	2.20	0.21	3141.8	2006.1	10
Netherland	8.30	0.52	3.90	0.93	5.10	0.52	4.30	0.72	1060.6	477.9	10
Norway	15.92	3.20	3.31	0.37	6.94	1.77	1.46	0.50	820.4	1106.3	25
Poland	6.27	1.80	4.57	0.54	4.33	0.69	1.36	0.31	570.3	314.4	30
Portugal	10.00	1.80	3.80	0.67	12.33	3.31	2.93	0.75	3366.7	1353.9	15
Spain	13.90	1.59	4.75	0.46	10.25	2.73	2.90	0.91	15352.5	16320.6	20
Sweden	15.24	3.14	3.12	0.10	5.54	1.39	2.44	0.41	2116.6	2133.5	25
UK	12.63	5.51	4.47	0.75	7.53	1.64	2.20	1.20	31152.2	18908.4	30
Total	12.55	5.44	4.20	1.16	7.79	4.24	2.12	1.38	9206.60	16005.89	320

Notes: The variables are defined in the notes of Table 4.4. All the variables are the average of its annual values over the period 2008-2012.

4.3 The impact of IFRS adoption on the value relevance

Table 4.6 Panel A reports the results of estimating the price model for the main sample of all financial firms, including banks, over the study period (1998-2012) and for the pre-IFRS adoption period (1998-2004), as well as the IFRS adoption period (2006-2012). Panel B reports the results for the sub-sample of banks. As pointed out in equation 3.12 in Chapter 3, this study uses fixed effect estimator with robust standard errors in the first empirical part of the thesis.

Starting with Panel A, the estimated valuation coefficient on book value of equity per share, b_1 , is statistically insignificant for the entire sample period, and over both the pre-IFRS adoption and the IFRS adoption periods. In terms of earnings per share, the valuation coefficient, b_2 , is positive and statistically significant for the entire study period (at the 0.05 level). The coefficient increases from 1.672 (significant at the 0.05 level) in the pre-IFRS adoption period to 2.82 (significant at the 0.01 level) after IFRS adoption.

Results of the same test for the sub-sample of banks show that the valuation coefficient on book value of equity per share, b_1 , is always negative but is statistically different from zero (significant at the 0.01 level) only for the pooled sample that includes the entire period.⁸⁰ The valuation coefficient on earnings per share, b_2 , is always positive, and shows an increase from 2.389 (significant at the 0.01 level) over the period of pre-IFRS adoption to 2.452 (significant at the 0.01 level) after the mandatory introduction of IFRS in 2005. This evidence of changes in the coefficients following IFRS adoption is comparable to that reported by Agostino et al. (2011) and Manganaris et al. (2015) regarding European financial firms.

⁸⁰ Section 4.4 provides possible explanations for the negative coefficient on the book value of equity. This explanation is not emphasised here given that different accounting standards are used to prepare the financial statements of the sample firms (i.e. local accounting standards before 2005 and IFRS since 2005), which might drive these results.

Table 4. 6 The impact of IFRS adoption on value relevance of accounting information

VARIABLES	Coeff.	Panel A Financial Firms (inc. Banks)			Panel B Banks (only)		
		Pooled (1998-2012)	Pre-IFRS (1998-2004)	IFRS (2005-2012)	Pooled (1998-2012)	Pre-IFRS (1998-2004)	IFRS (2005-2012)
<i>BVPS</i>	b_1	0.151 (0.191)	0.0317 (0.0625)	-0.0127 (0.0394)	-0.107*** (0.0373)	-0.0232 (0.0697)	-0.0315 (0.0442)
<i>EPS</i>	b_2	2.733** (1.248)	1.672** (0.682)	2.82*** (0.423)	3.192*** (0.566)	2.389*** (0.914)	2.452*** (0.538)
<i>Constant</i>		25.33*** (9.030)	42.02*** (4.217)	28.25*** (2.815)	34.84*** (4.823)	33.27*** (4.606)	29.14*** (4.564)
Year dummy		yes	yes	yes	yes	yes	yes
D_t							
Observations		2799	1,263	1536	2,131	963	1,168
No of firms		194	194	194	148	148	148
Within R^2		0.416	0.242	0.514	0.378	0.244	0.494
Difference			0.2719***			0.247***	

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the fixed effect estimation of the price model as follows: $P_{it} = b_0 + b_1 BVPS_{it} + b_2 EPS_{it} + \delta D_t + \varepsilon_{it}$, where P_{it} is the market value per share of firm i three months following the end of fiscal year t . $BVPS_{it}$ is the book value of equity per share for firm i at the end of fiscal year t . EPS_{it} is the reported earnings per share of firm i over the fiscal year t and D_t are year dummy variables. The difference in the value relevance of accounting information between pre-IFRS adoption period (1998-2004) and IFRS adoption period (2005-2012) is measured by the difference in the within explanatory power of price model, within R^2 , over the two periods. The significance of the difference in within R^2 is tested based on Z statistics $= (R_{post}^2 - R_{pre}^2) / (\sigma_{R_{post}^2}^2 + \sigma_{R_{pre}^2}^2)^{0.5}$ where $\sigma_{R_{post}^2}^2$ and $\sigma_{R_{pre}^2}^2$ are the variance of coefficients of determination of the within-group estimator using bootstrap methods following Agostino et al. (2011: 444). The results are reported for the entire sample of financial firms in Panel A and for the sub-sample of banks in Panel B.

However, these results are not consistent with the view that IFRS balance sheet numbers, compared to income statements, become more value relevant following IFRS adoption. Some previous studies argue that since IFRS focus more on timely recognition of balance sheet items with a large use of fair value accounting (Ball, 2006), balance sheet numbers reported under IFRS tend to be more emphasised for valuation purposes (i.e. more value relevant) (Hung and Subramanyam, 2007; Karampinis and Hevas, 2011; Tsalavoutas et al., 2012). On the other hand, net income reported in accordance with fair value oriented accounting standards, such as IFRS, becomes more volatile, less persistent, and thereby less value relevant (Schipper and Vincent, 2003; Ball, 2006; Hodder et al., 2006; Hung and Subramanyam, 2007). Overall, the results reported in this chapter demonstrate that there could be a change in the valuation weight (valuation focus) between equity book value versus net income numbers after IFRS enforcement (see Hung and Subramanyam, 2007; Devalle et al., 2010; Agostino et al., 2011). Yet investigating the changes in the valuation roles of equity book value and net income as a result of IFRS

adoption is beyond the scope of the thesis. It is worth mentioning that the changes in the valuation weights of the balance sheet and the income statement could be caused by the financial crises that hit the economies of the countries in the sample over the period under study. Also, several factors other than financial reporting standards might drive these results, such as country-level institutional environment and firm-level characteristics. Some of these factors are addressed in the examination of the valuation roles of the balance sheet and income statement during the crisis period (see Section 4.4 in this chapter).

As discussed in chapter 3, the valuation coefficient on book value of equity for a sample of financial firms is expected to be close to one. The results in Table 4.6 are not consistent with this expectation. One reason for this could be the scaling methods used in this thesis. Other accounting scholars use alternative scaling methods than number of shares, such as lagged total assets (e.g. Marquardt and Wiedman, 2004; O'Hanlon and Taylor, 2007; Manganaris et al., 2015) and lagged book value of equity (e.g. Lai and Krishnan, 2009; Rees and Valentincic, 2013; Middleton, 2015). As a robustness check, this thesis uses both the lagged total assets (Section 4.6) as well as the lagged book value of equity (Appendix V) as alternative scaling methods. With the alternative scaling methods the coefficient on book value of equity is positive and greater in magnitude as well as closer to one (i.e. its theoretical value). The findings from the estimations using alternative scaling methods yield inference that are largely similar to those obtained from the main estimations scaled by the number of ordinary shares. It is worth mentioning there is no consensus among accounting researchers on the best scaling methods that eliminate scale effect. Barth and Clinch (2009) show evidence that the unscaled price model and the price model scaled by the number of ordinary shares perform best, among other specifications, in mitigating the scale

effect.⁸¹ Therefore, this thesis uses the number of outstanding shares to scale all the market and accounting variables in the price model.

An alternative explanation for the unexpected magnitude of the coefficient on book value of equity is that the coefficient is constrained to be the same across the countries under study. However, most of the countries under study do not have a sufficient number of observations to draw a conclusion from single country regressions.

The first hypothesis, *H1A*, to be tested is on the impact of IFRS adoption on the value relevance of accounting information. The within explanatory power (within R^2) is the measure under scrutiny, capturing the overall value relevance of book value of equity and earnings. For the main sample of financial firms, the within R^2 is 0.242 in the pre-IFRS adoption period and increases to 0.514 over the IFRS adoption period. The Z statistics, which is computed using bootstrapping techniques (see Agostino et al., 2011: 444), shows that there is a significant increase in the within explanatory power of price model after IFRS enforcement. Similarly, for the sub-sample of banks, the within R^2 increases from 0.244 in the pre-IFRS adoption period to 0.494 following IFRS adoption, and this increase is statistically significant. The results suggest that mandatory IFRS adoption results in an improvement in the value relevance of financial statements prepared by financial firms in Europe. This supports the first hypothesis, *H1A*, which predicts that the value relevance of accounting information increases following mandatory IFRS adoption by financial firms. These findings are comparable to those obtained in previous studies that document an increase in the value relevance of accounting information after the mandatory introduction of IFRS (Filip, 2010; Devalle et al., 2010; Liu et al., 2011).

⁸¹ Barth and Clinch (2009) posit that compared to other apparently size related scalars, such as book value of equity and market value of equity, the number of outstanding shares is a better proxy for scale, because it does not fluctuate widely on a yearly basis, as well as it is less likely to be affected by variation unrelated to the scale effects (such as economy-wide factors) that cause econometric difficulties.

However, the findings of this study are not consistent with those of prior research reporting a decrease or no improvement in the value relevance of financial statements after mandating IFRS in lieu of domestic financial reporting standards (see, e.g., Karampinis and Hevas, 2011; Aubert and Grudnitski, 2011; Tsalavoutas et al., 2012). In this context two observations should be made. First, compared to the longer time span included in this empirical analysis (eight years of IFRS adoption), existing studies are conducted based on samples related to the early years of IFRS adoption. Investors as well as financial statements analysts might not be familiar with the new standards in the early period of implementation (Li, 2010; Liu et al., 2011; Houque et al., 2012). Additionally, firms in the transition to IFRS period typically continue their pre-IFRS national accounting “tradition” (Kvaal and Nobes, 2010; Kvaal and Nobes, 2012). Taken together, the effect of IFRS adoption could be uncertain in the early years of adoption. Second, many previous studies include firms from different industries in their samples, and typically exclude financial firm, which also might explain the different results in this study. Accordingly, Barth et al. (2012) find the adjustment to net income from local accounting standards to IFRS relating to financial instrument under IAS 39 is value relevant for financial firms only, but not for other non-financial firms. More importantly, the empirical findings of this study support the earlier evidence of positive impact of IFRS adoption on the value relevance of financial statements prepared by European financial firms (i.e. the results of Agostino et al., 2011), which is consistent with the view that IFRS adoption results in higher accounting information quality.

4.4 The impact of the financial crisis on the value relevance

The second hypothesis, *H2A*, examines the impact of the crisis period (2008-2012) on the valuation roles of the book value of equity and earnings. The analysis starts by evaluating the influence of the financial crisis on the combined value relevance of the book value of equity and earnings. As reported in Columns (1) and (2) in Table 4.7, the difference in the within R^2 between the period of pre-crisis and the crisis period is not statistically significant for both the whole

sample of financial firms and the sub-sample of banks. Interestingly, the valuation coefficient on book value of equity per share increases from 0.0065 (statistically insignificant) for the pre-crisis period to 0.0856 and becomes significant at the 0.01 level during the financial crisis for the whole sample. The subsample of banks confirms this pattern. For the whole sample of financial firms, the valuation coefficient on earnings appears to decrease sharply from 3.095 (significant at the 0.01 level) over the period of pre-crisis to 0.769 (significant at the 0.01 level) during the crisis period. The sub-sample of banks shows consistent results where the coefficient on earnings decreases from 3.745 (significant at the 0.05 level) to 0.728 (significant at the 0.01 level). These results are in line with the prediction of higher (lower) value relevant book value of equity (earnings) over the crisis period. The direction and the significance of these changes are examined below (Column (3) of Table 4.7).

Column (3) in Table 4.7 presents the results on the impact of financial crisis starting in 2008 on the value relevance of book value of equity and earnings. In the fully interacted model in Column (3), the increment to the intercept, b_1 , which captures the effect of crisis period on market value per share, is negative and significantly different from zero. This can reflect the decrease in market value of equity as a result of financial crisis, which is consistent with the descriptive statistics depicting a lower equity market value on average for the period of the financial crisis (2008-2012) compared to the pre-crisis period (2005-2007). The coefficient on *BVPS*, b_2 , can be interpreted as the valuation of book value of equity before financial crisis. The valuation coefficient b_2 is negative but statistically insignificant. On the other hand, the coefficient on earnings before the crisis period, b_4 , is positive (equals 3.312) and statistically different from zero at the 0.01 level. Earnings play a more important valuation role relative to book value of equity before the crisis period. This is consistent with the results of Agostino et al. (2011) and Manganaris et al. (2015) that net income figures are more emphasised for valuation purposes over the period of IFRS adoption for a sample of European financial firms.

It is worth mentioning here that the model in column (3) is not exactly the combination of the models in columns (1) and (2). This is because *Crisis* has not been interacted with year dummy variables included in the model (3).⁸² Besides, the thesis uses firm fixed effect models in the first empirical part, which implies that the variable *Crisis* needs to be interacted with firm fixed effect to yield a model in column (3) equivalent to the combination of those reported in column (1) and (2). If the thesis used OLS regressions and *Crisis* were interacted with year dummy variables, the estimated coefficient on book value of equity (earnings) in column (3) would be the same as that in column (1) and the interaction in column (3) should reflect the difference between the respective coefficients from models (1) and (2). The models in columns (1) and (2) are introduced here only as a complementary analysis to evaluate the changes in the combined value relevance of book value of equity and earnings during the crisis period.

Table 4. 7 The impact of the financial crisis on the value relevance

		Panel A Financial Firms (incl. Banks)			Panel B Banks (only)		
		(1)	(2)	(3)	(1)	(2)	(3)
		Pre-Crisis	Crisis	Entire	Pre-Crisis	Crisis	Entire
Coeff. ⁸³		(2005-2007)	(2007-2012)	(2005-2012)	(2005-2007)	(2007-2012)	(2005-2012)
<i>Crisis</i>	b_1			-17.88*** (2.717)			-22.08*** (3.035)
<i>BVPS</i>	b_2	0.00646 (0.0621)	0.0856*** (0.0136)	-0.0893 (0.0564)	-0.0702 (0.0974)	0.0888*** (0.0141)	-0.152** (0.0708)
<i>Crisis* BVPS</i>	b_3			0.137*** (0.0520)			0.198*** (0.0662)
<i>EPS</i>	b_4	3.095*** (0.841)	0.769*** (0.210)	3.312*** (0.723)	3.745** (1.469)	0.728*** (0.223)	4.241*** (0.935)
<i>Crisis* EPS</i>	b_5			-2.095*** (0.768)			-2.941*** (0.990)
<i>Constant</i>	b_0	19.34*** (4.874)	4.769*** (1.167)	26.91*** (2.674)	20.89*** (4.669)	3.030** (1.512)	25.33*** (3.846)
Year dummy D_t		yes	yes	Yes	yes	yes	Yes
Observations		582	954	1,536	444	724	1,168
Number of firms		194	194	194	148	148	148
R^2 (within)		0.388	0.406	0.537	0.395	0.417	0.537
Difference		0.018			0.022		

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. Column (1) and (2) report the fixed effect estimations of the price model as follows: $P_{it} = b_0 + b_1BVPS_{it} + b_2EPS_{it} + \delta D_t + \varepsilon_{it}$, where P_{it} is the market value of firm i three months following the end of fiscal year t . $BVPS_{it}$ is the book value of equity per share for firm i at the end of fiscal year t . EPS_{it} is the reported earnings per share of firm i over the fiscal year t and D_t are year dummy variables. Column (3) reports the fixed effect estimation of $P_{it} = b_0 + b_1Crisis + b_2BVPS_{it} + b_3Crisis * BVPS_{it} + b_4EPS_t + b_5Crisis * EPS_{it} + \delta D_t + \varepsilon_{it}$ over the period 2005-2012. *Crisis* is a dummy variable coded 1

⁸² The crisis dummy variables, *Crisis*, is not interacted with the year dummy variables since the year dummies are not those of interest in this study and they have been added to the model to control for the year effect.

⁸³ The coefficients correspond only to the regressions in Column (3) evaluating the impact of the financial crisis.

for the years of crisis period (2008-2012) and zero otherwise. The difference in the value relevance of accounting information between pre-crisis period (2005-2007) and crisis period (2005-2012) is measured by the difference in the within explanatory power of price model, within R^2 , over the two periods. The significance of the difference in within R^2 is tested based on Z statistics = $(R_{crisis}^2 - R_{pre}^2) / (\sigma_{R_{crisis}^2}^2 + \sigma_{R_{pre}^2}^2)^{0.5}$ where $\sigma_{R_{crisis}^2}^2$ and $\sigma_{R_{pre}^2}^2$ are the variance of coefficients of determinations of the within-group estimator using bootstrap methods following Agostino et al. (2011: 444). Panel A shows the statistics for the entire sample of financial firms and Panel B reports those of the sub-sample of banks. Coeff. presents the coefficients corresponding only to the regressions in Column (3) evaluating the impact of the financial crisis.

The main valuation coefficients of interest are those on the interaction between financial crisis and accounting numbers, b_3 and b_5 in equation (3.14). They reflect the impact of financial crisis on the valuation roles of book value of equity and earnings, as summary measures of the balance sheet and income statement, respectively. Based on the empirical findings of Barth et al. (1998a), this study hypothesises that the value relevance of book value of equity increases, while that of net income decreases as the financial crisis hits. As such, b_3 is predicted to be positive and b_5 to be negative. The interaction term between financial crisis and book value of equity is positive ($b_3 = 0.137$) and statistically different from zero (at the 0.01 level), suggesting an increase in the valuation role of balance sheet figures. In contrast, the valuation coefficient on the interaction between financial crisis and earning is negative ($b_5 = -2.095$) and significant at the 0.01 level. These results confirm the prediction of higher (lower) value relevant book value of equity (net income) as the financial crisis evolves.

Turning to the sub-sample of banks in Panel B, in Column (3) the coefficient on BVPS, b_2 , can be interpreted as the valuation of equity book value of equity prior the crisis. b_2 is unexpectedly negative and significant for the sub-sample of banks. One possible reason put forward by Hao et al. (2011) is that the valuation coefficient on book value of equity has a negative value for high profitable firms. For such firms the investment growth causes “equity value to decrease with equity book value” (Hao et al., 2011: 607).^{84,85} This might be the case for European banks before the crisis period when there had been a significant increase in Euro-dominated securitisation by

⁸⁴ In particular, they find that growth has a negative effect on the slope of the market value and book value of equity for firms with high profitability.

⁸⁵ Another possible reason for negative book value of equity could be constraining the coefficient on equity book value to be the same across countries (Barth et al., 2014).

banks since 2004 (Altunbas et al., 2009). In particular, banks could show high profitability in this period given that they tend to securitise mortgage loans and move them off their balance sheets. Higher profitability due to securitisation could be obtained as a result of the reduction in assets or via the reinvestment of the freed-up resources (Martínez-Solano et al., 2009). Moreover, negative coefficient on book value of equity is reported in some prior studies (see, for example, Amir and Lev, 1996; Shortridge, 2004, Barth et al., 2014). The coefficient on the interaction between financial crisis and book value of equity equals 0.198 and is statistically significant at the 0.01 level. Column (3) also reveals that the coefficient on earnings before the crisis, b_4 , is positive and statistically significant. The valuation coefficient on the interaction term between financial crisis and earning is negative ($b_3 = -2.941$) and statistically different from zero at the 0.01 level. That is, the results of the sub-sample of banks confirm those of the entire sample that the book value of equity tends to be more value relevant, whereas earnings are less value relevant when the financial crisis hit the economy since 2008.

In sum, the empirical findings reported in Table 4.7 for both the whole sample and the sub-sample of banks support the prediction on the equity valuation implication of the distinctive roles of the balance sheet and the income statement during the financial crisis. These results confirm *H2A*, which posits an increase in the value relevance of equity book value in comparison to a decrease in that of earnings as the crisis evolves. The findings of this study are comparable to previous studies investigating the value relevance of financial statements as a function of firm-specific financial health (Barth et al., 1998a) as well as the Asian financial crisis (Graham et al., 2000; Davis-Friday et al., 2006).

4.5 The impact of institutional environment and corporate governance

4.5.1 Institutional environment

To evaluate the impact of the institutional environment on the value relevance of book value of equity and net income during the crisis period, as stated in *H3A*, a multiplicative interaction model

is chosen where the partial effect of accounting information on market value of equity is conditional on the institutional environment. In order to summarise the underlying characteristics of institutional environment, as discussed in Chapter 3, the present study creates a standardised institutional score, *INSSCORE*, based on the principal-component factor analysis of five country-level variables: *Efficacy of corporate boards*, *Strength of auditing and reporting*, *Protection of minority shareholders' interests*, *Regulation of securities exchanges*, and *Judicial independence*. Previous accounting studies follow such approach to capture country-specific characteristics (see, for example, Nobes, 2011; Nobes and Stadler, 2013).

Table 4.8, Panel A, reports the correlation coefficients among the institutional environment factors. Panel B presents the factor loadings for the “varimax orthogonal rotation”,⁸⁶ which depict the weights of individual variables in calculating the institutional score. As expected, all institutional variables are positively loaded in constructing *INSSCORE*. The factor analysis results in a factor with the eigenvalue⁸⁷ of 4.513, which captures more than 0.90 of the total variation in the original data. The second column reports the Kaiser-Meyer-Olkin (KMO) index of sampling adequacy (see Kaiser, 1974). The mean of this measure is 0.8055 and much greater than the suggested threshold 0.50, indicating that *INSSCORE* captures the underlying common factors of the five institutional variables used (Stewart, 1981). Finally, Panel C depicts the descriptive statistics of *INSSCORE* where the mean is 0 and standard deviation is 1 owing to standardisation. An inverse decile rank, *INSRANK*, is created ranging from 0, which reflects the highest values of *INSSCORE* (strong institutional environment) to 9 representing the lowest values of *INSSCORE* (weak institutional environment), and then it is scaled by 9.

⁸⁶ In order to simplify the factor structure and hence to make its interpretation easier, Varimax rotation is applied to the factors. Varimax rotation, developed by Kaiser (1958), is most widely used rotation method (Abdi, 2003). It makes each variable to be associated with one (or only a small number) of factors, as well as each factor to represent only a small number of variables.

⁸⁷ Eigenvalues can be defined as a set of scalars that are associated with a linear system of equations (as such as a matrix equation). They are sometimes called characteristic values, quadratic roots, proper values or latent roots (Nobes, 2011).

Table 4. 8 Principal component analysis of institutional environment variables
Panel A Correlations

	<i>Efficacy of corporate boards</i>	<i>Strength of auditing & reporting</i>	<i>Protection of minority interests</i>	<i>Regulation of securities exchanges</i>	<i>Judicial Independence</i>
<i>Efficacy of corporate boards</i>	1				
<i>Strength of auditing & reporting</i>	0.9669 (0.000)	1			
<i>Protection of minority interests</i>	0.8980 (0.000)	0.9177 (0.000)	1		
<i>Regulation of securities exchanges</i>	0.8784 (0.000)	0.8810 (0.000)	0.8232 (0.000)	1	
<i>Judicial independence</i>	0.9150 (0.000)	0.8575 (0.000)	0.8674 (0.000)	0.7702 (0.000)	1

Panel B Institutional environment factor score analysis and sample adequacy

Variables	Factor Loading Coefficients	Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy ⁸⁸
<i>Efficacy of corporate boards</i>	0.9814	0.7398
<i>Strength of auditing & reporting</i>	0.9742	0.7585
<i>Protection of minority interests</i>	0.9491	0.8509
<i>Regulation of securities exchanges</i>	0.9156	0.9589
<i>Judicial independence</i>	0.9284	0.7751
<i>Variation Explained</i>	0.9027	Mean KMO =0.8055
<i>Eigenvalue</i>	4.51327	

Panel C Descriptive statistics of institutional environment score and ranking

Variable	Obs	Mean	Std. Dev.	Min	P25	Median	P75	Max
<i>INSSCORE</i>	954	0.00	1.00	-1.88	-0.99	0.35	0.74	1.41
<i>INSRANK</i>	954	0.44	0.32	0.00	0.22	0.44	0.78	0.89

Notes: (1) *Efficacy of corporate boards*, (2) *Strength of auditing and reporting*, (3) *Protection of minority interests*, (4) *Regulation of securities exchanges*, and (5) *Judicial independence* are the institutional environment variables extracted from Global Competitiveness Report, reported as means for the period 2008-2012. The institutional environment variables are defined in the notes of Table 4.3. These measures are coded on a scale from 1 to 7, where a value of 1 is associated with weak institutional factor and 7 indicates a strong institutional setting. Panel A shows Pearson correlation coefficients among institutional variables. The numbers in parentheses are p-values. Panel B reports factor loading coefficients as well as Kaiser-Meyer-Olkin index of sampling adequacy for institutional factors using the five institutional variables. Panel D presents the descriptive statistics on *INSSCORE* and *INSRANK*. *INSSCORE* is the standardised score calculated using the factor analysis in Panel B. *INSRANK* is the inverse decile rank of *INSSCORE* with a range from 0 (strong institutional environment) to 1 (weak institutional environment).

⁸⁸ “The KMO statistic for an individual variable is the sum of the squared correlation coefficients between this variable and all other variables (but not with itself) divided by this value added to the sum of the squared partial correlation coefficients. The KMO statistic for multiple variables is the sum of these statistics computed for all variables in the analysis” (Hutcheson and Sofroniou1999: 224). KMO statistics measures the extent to which the underlying variables belong together and hence suitable for factor analysis. Kaiser (1974) suggests the threshold of KMO = 0.50 under which it is considered that there is little variation shared between variables to be meaningfully explained using principle component factor analysis.

Panel A in Table 4.9 reports the results of the price model after adding the interactions between the institutional environment rank and both book value of equity and earnings over 2008-2012 for the whole sample of financial firms. The coefficient on book value of equity, b_1 , can be interpreted as the valuation of equity book value for firms in countries with strong institutional environment. It appears to be negative but not statistically significant at the 0.05 level. Moving to the coefficient of interest, b_2 , it is predicted that weak institutional environment results in more value relevant book value of equity during the financial crisis period. The estimated coefficient on the interaction between equity book value and institutional rank is positive and statistically significant ($b_2 = 0.405$). Since the strength of institutional environment ranges from 0, indicating a strong environment, to 1, reflecting weak institutional environment, these results suggest that investors in firms domiciled in countries with weak institutional environments appear to place more valuation weight on equity book value. The coefficient on reported earnings is positive ($b_3 = 0.865$) and different from zero at the 0.05 level for firms in strong institutional environment. It is expected that investors in weak institutional environment will place a lower valuation weight on income statement numbers during the crisis. The valuation coefficient on the interaction between the strength of institutional environment and earnings, $b_4 = 0.164$ is positive, contrary to the predication; however it is not statistically significant. This does not support the significant impact of the institutional environment on the valuation weight of earnings over the crisis period.

Table 4. 9 The impact of institutional environment on value relevance

	Coeff.	Panel A Financial Firms (incl. Banks)	Panel B Banks (only)
<i>BVPS</i>	b_1	-0.120* (0.0705)	-0.135 (0.0822)
<i>INSRANK</i> * <i>BVPS</i>	b_2	0.405*** (0.136)	0.439*** (0.158)
<i>EPS</i>	b_3	0.865** (0.393)	0.911* (0.483)
<i>INSRANK</i> * <i>EPS</i>	b_4	0.164 (0.731)	0.0428 (0.886)
Constant	b_0	3.972*** (0.914)	1.708 (1.254)
Year dummy D_t		Yes	Yes
Observations		954	724
Number of firms		194	148
R^2 (within)		0.415	0.427

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the fixed effect estimation of $P_{it} = b_0 + b_1BVPS_{it} + b_2INSRANK * BVPS_{it} + b_3EPS_t + b_4INSRANK * EPS_{it} + \delta D_t + \varepsilon_{it}$ over the crisis period from 2008-2012 where P_{it} is the share price of a firm i three months following the end of fiscal year t . $BVPS_{it}$ is the book value of equity per share for firm i at the end of fiscal year t . EPS_t is the reported earnings per share of firm i over the fiscal year t and D_t are year dummy variables. *INSRANK* is institutional rank ranging from 0 (weak institutional environment) to 9 (strong institutional environment), which is constructed based on the factor score, *INSSCORE*, using principal-component factor analysis of five institutional variables collected over the period 2008-2012: (1) *Efficacy of corporate boards*, (2) *Strength of auditing and reporting standards*, (3) *Protection of minority shareholders' interests*, (4) *Regulation of securities exchanges*, and (5) *Judicial independence*. The institutional environment variables are defined in the notes of Table 4.3. Panel A shows the statistics for the entire sample of financial firms and Panel B reports those of the sub-sample of banks.

The results suggest that the institutional environment plays a key role in determining the valuation weight of the balance sheet but not in that of income statement during the financial crisis. In particular, investors tend to rely more on the balance sheet numbers for valuation purposes in the countries with weak institutional environments during the crisis period. That is, the third hypothesis in this empirical part is partially supported, since *H3A* states that during the financial crisis the value relevance of equity book value increases and that of net income decreases for firms in countries characterised by a weak institutional environment. Moreover, there is consistency in the results for the main sample of financial firms and those for the sub-sample of banks. These findings are comparable with those obtained from the study of Davis-Friday et al. (2006) suggesting that the institutional settings have an influence on the value relevance of book value of equity but not on that of net income during the Asian crisis period. In general, the findings are in line with previous research emphasising the importance of institutional

environment in determining the quality of accounting information (Black and White, 2003; Leuz et al., 2003; Anandarajan et al. 2011; Huoqe et al., 2012).

4.5.2 Corporate governance

Additionally, this study evaluates in *H4A* whether firm-level corporate governance has an impact on the value relevance of book value of equity and net income during the crisis period. As such, interaction terms between the strength of corporate governance and both equity book value and earnings are added to the price model estimated over 2008-2012.

A standardised governance score, *GOVSCORE*, is created using the principal-component factor analysis of five firm-level governance variables: *Board Meeting*, *Audit Size*, *Audit Meeting*, *No of Block* and *Audi Fee*.

Panel A of Table 4.10 provides the correlation coefficients between corporate governance variables. The principal-component factor analysis isolates random measurement errors that might be associated with corporate governance variables (Baik et al., 2009). Previous accounting studies adopt this approach to summarise firm-specific characteristics (Larcker et al., 2007; Song et al., 2010; Chen et al., 2012). Panel B reports the weights (i.e. the factor loadings for the varimax orthogonal rotation) used to calculate the single factor representing corporate governance mechanisms at firm level, *GOVSCORE*. With the exception of *No of block*, the corporate governance variables are positively associated with the constructed variable, *GOVSCORE*. Large shareholders can extract private benefits from their position as controlling investors at the expenses of minority shareholders (Shleifer and Vishny, 1997; Faccio et al., 2001; Conyon and Florou, 2002; Bhojraj and Sengupta, 2003; Liu and Magnan, 2011), which might explain the negative association with *GOVSCORE*.

The generated governance variable, *GOVSCORE*, has an eigenvalue of 1.7852 and captures more than 0.35 of the total variance in the original corporate governance variables. As it can be noticed in Panel B, the mean of Kaiser-Meyer-Olk (KMO), the measure of sampling adequacy, is 0.5522

which is greater than 0.50, suggesting that the constructed variable, *GOVSCORE*, well represents the five underlying corporate governance variables. *GOVSCORE* is a standardised variable; thereby its mean and standard deviation are 0 and 1, respectively (see Panel C of Table 4.10). Furthermore, corporate governance quality is highly associated with country-level institutional environment characteristics, such as investor protection and legal enforcement (Durnev and Kim, 2005; La Porta et al., 2000). To address this concern, corporate governance score, *GOVSCORE*, is regressed on country dummy variables, *COUNTRY* (see, Verriest et al., 2013). The residuals from this regression are used to create an inverse decile rank of corporate governance, *GOVRANK* that ranges from 0 for firms with strong corporate governance mechanisms to 9 for those with weak governance mechanisms, and then scaled by 9. Panel C of Table 4.10 reports the descriptive statistics on corporate governance score, *GOVSCORE*, as well as governance rank, *GOVRANK*.

**Table 4. 10 Principal component analysis of corporate governance variables
Panel A Correlations**

	<i>Board Meeting</i>	<i>Audit Size</i>	<i>Audit Meeting</i>	<i>No of block</i>	<i>Audit Fee</i>
<i>Board Meeting</i>	1				
<i>Audit Size</i>	-0.016 (0.660)	1			
<i>Audit Meeting</i>	0.5728 (0.000)	0.1324 (0.001)	1		
<i>No of block</i>	-0.2254 (0.000)	0.0005 (0.989)	-0.256 (0.000)	1	
<i>Audit Fee</i>	0.0191 (0.599)	0.2214 (0.000)	0.155 (0.000)	-0.1131 (0.002)	1

Panel B Corporate governance factor score analysis and sample adequacy

Variables	Factor Loading Coefficients	Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy
<i>Board Meeting</i>	0.7802	0.5307
<i>Audit Size</i>	0.2192	0.4835
<i>Audit Meeting</i>	0.8493	0.5407
<i>No of block</i>	-0.5478	0.7523
<i>Audit Fee</i>	0.3273	0.5505
<i>Variation Explained</i>	0.3570	Mean KMO =0.5522
<i>Eigenvalue</i>	1.7852	

Panel C Descriptive statistics of corporate governance score and ranking

Variable	Obs	Mean	Std. Dev.	Min	P25	Median	P75	Max
<i>GOVSCORE</i>	470	0.00	1.00	-2.18	-0.74	-0.16	0.64	3.37
<i>GOVRANK</i>	470	0.50	0.32	0.00	0.22	0.44	0.78	1.00

Notes: the number reported for five firm-level corporate governance variables are the means over the period 2008-2012. The variables include (1) *Board Meeting*, (2) *Audit Size* (3) *Audit Meeting*, (4) *No of block*, and (5) *Audi Fee*. The corporate governance variables are defined in the notes of Table 4.4. Panel A report the Pearson correlation coefficients among corporate governance variables. The numbers in parentheses are p-values. Panel B shows the factor loading coefficients as well as the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy for the constructed governance variable generated based the principle component factor analysis. Panel D presents the descriptive statistics on *GOVSCORE* and *GOVRANK*. *GOVSCOE* is the standardised score calculated using the factor analysis shown in Panel B. *GOVRANK* is an inverse decile rank of the residuals from the regression of *GOVSCORE* on country dummy variables, *COUNTRY*. *GOVRANK* ranges from 0 for strong corporate governance mechanisms to 1 reflecting weak governance mechanisms.

Panel A of Table 4.11 reports the results of testing the impact of corporate governance on the value relevance of equity book value and earnings for the whole sample of financial firms. The coefficient on book value of equity ($b_1 = -0.257$) is negative but not statistically significant, which can interpreted as the valuation on equity book value for firms with strong corporate governance. The interaction between corporate governance and book value of equity is positive ($b_2 = 2.450$), as expected, and statistically significant. Corporate governance rank ranges from 0 for firms with

strong corporate governance to 1 for those with weak governance mechanisms.⁸⁹ Therefore, the positive coefficient on the interaction between corporate governance and equity book value indicates a higher valuation for balance sheet numbers of firms with weaker corporate governance mechanisms. The valuation coefficient on earnings is positive and not statistically significant at the 0.05 level. The interaction between the strength of corporate governance and earnings is negative ($b_2 = -4.707$), in line with the expectation; however, it is not statistically significant. Hence, corporate governance practices appear to not have significant impact on the value relevance of earnings during the crisis.

For the subsample of banks, the valuation coefficient on book value of equity is negative and that of earnings are positive ($b_1 = -0.413$, $b_3 = 0.220$); yet they are not statistically significant. It is noteworthy that in the interaction models for both the main sample of financial firms and the subsample of banks, the estimated coefficients on book value of equity and earnings are not statistically significant. These insignificant coefficients on accounting information are not uncommon in interaction models due to the potential high correlation between interaction terms and their constituents (Agostino et al., 2011; Wooldridge, 2012).⁹⁰ The coefficients of interest here are those on the interactions between corporate governance ranking variable and both equity book value and net income. As predicted, the valuation coefficient on the interaction between corporate governance and book value of equity is positive, $b_2 = 2.704$, and statistically different from zero at the 0.01 level. For the interaction between corporate governance and earnings, the valuation coefficient is positive, $b_4 = 0.846$, but statistically insignificant.

⁸⁹ The original variable is a decile rank from 0 to 9, but then it is scaled by 9.

⁹⁰ The multicollinearity in interaction models affects the significance of the constituent variables but not that of the interaction term (i.e. the variables of interest), and thus it is not a major concern (Govindarajan and Fisher, 1990; Gul and Chia, 1994; Wooldridge, 2012). In fact, testing for multicollinearity shows relatively high Variance Inflation Factor (VIFs over 5) on *BVPS* and *EPS* in the governance interaction model for both the main sample of financial firms and the sub-sample of banks.

To sum up, the results suggest that the balance sheet tends to be more value relevant in the period of financial crisis for firms with weak corporate governance mechanisms, and these results are consistent for both the whole sample of financial firms and the sub-sample of banks.

Table 4. 11 The impact of corporate governance on value relevance

		Panel A Financial Firms (incl. Banks)	Panel B Banks (only)
	Coeff.	(2)	(2)
<i>BVPS</i>	b_1	-0.257 (0.481)	-0.413 (0.497)
<i>GOVRANK* BVPS</i>	b_2	2.450** (1.009)	2.704*** (0.999)
<i>EPS</i>	b_3	1.278* (0.679)	0.220 (1.083)
<i>GOVRANK * EPS</i>	b_4	-1.293 (1.393)	0.846 (2.517)
Constant	b_0	-4.707 (3.883)	-4.279 (4.401)
Year dummy D_t		Yes	Yes
Observations		470	320
Number of firms		95	65
R^2 (within)		0.611	0.647

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the fixed effect estimation of $P_{it} = b_0 + b_1BVPS_{it} + b_2GOVRANK * BVPS_{it} + b_3EPS_t + b_4GOVRANK * EPS_{it} + \delta D_t + \varepsilon_{it}$ over the crisis period, 2008-2012, where P_{it} is market value per share of firm i three months following the end of fiscal year t . $BVPS_{it}$ is the book value of equity per share for firm i at the end of fiscal year t . EPS_t is the reported earnings per share of firm i over the fiscal year t and D_t are year dummy variables. *GOVRANK* is a decile rank of corporate governance at firm level. Principle-component factor analysis is used to construct a corporate governance score, *GOVSCORE*, based on the means of five firm-level corporate governance variables collected over 2008-2012 including: (1) *Board Meeting*, (2) *Audit Size* (3) *Audit Meeting*, (4) *No of block*, and (5) *Audi Fee*. The corporate governance variables are defined in the notes of Table 4.4. To filter country-specific variations, *GOVSCORE* is regressed on dummy variables for countries and the residuals are used to form a decile governance rank, *GOVRANK*. *GOVRANK* ranges from 0 (weak corporate governance) to 9 (strong corporate governance), and then scaled by 9. Panel A shows the statistics for the entire sample of financial firms and Panel B reports those of the sub-sample of banks.

The impact of corporate governance on the valuation coefficient of the income statement is marginal. As such, these results provide partial support to the fourth hypothesis, *H4A*, which predicts that in times of financial crisis the value relevance of equity book value increases and that of net income decreases for firms with weak corporate governance. The overall findings of corporate governance influence are comparable to previous studies reporting a significant association between firm-specific corporate governance practices and accounting information quality (Frankel et al., 2002; Klein, 2002; Larcker et al., 2007; Verriest et al., 2013).

4.6 Additional analysis and robustness checks

For additional insights into the findings, this thesis partitions the sample into small and large financial institutions since information asymmetry problems are more likely to be higher for smaller firms (Atiase, 1985; Freeman, 1987). Financial firms with average total assets that are lower than the median for the entire sample are classified as small firms (1419 observations related to 97 firms), whereas those with total assets above the median as large firms (1380 observations related to 97 firms). As shown in Table 4.12 Panel A, for both the pre-IFRS adoption and the IFRS adoption periods, the book value of equity is not statistically significant for the subsample of small firms. The coefficient on earnings slightly decreases from 2.716 before IFRS adoption to 2.348 in the period of IFRS adoption; and it is statistically significant for both periods. More importantly, the explanatory power of the price model decreases by 0.01 from 0.524 for the pre-IFRS adoption period to 0.514 for the IFRS adoption period; yet the difference is not statistically significant.

Moving to the sub-sample of large financial firms, the valuation coefficient on book value of equity is positive and significant at the 0.01 level for the pre-IFRS adoption period; and it decreases and become statistically insignificant after mandating IFRS. The coefficient on earnings per share is statistically significant for both periods and appears to increase following the mandatory introduction of IFRS. The explanatory power (within R^2) significantly increases from 0.16 for the pre-IFRS adoption period to 0.463 after IFRS adoption. That is, the new financial reporting standards appear to improve the quality of accounting information of large financial firms that are expected to be more transparent. On the other hand, there is no significant change in the value relevance of accounting information following IFRS adoption for small financial firms that are potentially more opaque. These results are in line with those obtained by Agostino et al. (2011) that the impact of IFRS adoption is much larger for large financial firms compared to small financial firms.

Additionally, this thesis partitions the sub-sample of banks into low versus high Tier 1 capital ratio banks on the ground that managers might exercise their discretion over accounting numbers in order to meet capital requirements. Moyer (1990) documents that banks that are close to violating the minimum capital requirements might inflate their reported earnings. For example, bank managers might use their discretion over loan loss provisions and the timing of accounting write-downs in order to meet the capital requirements (Ahmed et al., 1999; Wilson et al., 2010; Vyas, 2011; Cohen et al., 2014).⁹¹ Therefore, bank capital ratios are expected to have an influence on the quality of accounting information. Accordingly, Anandarajan et al. (2011) find some evidence of an association between the value relevance of accounting information and banks' Tier 1 ratio (in their study, the association appears to be more significant for book value of equity than earnings). Banks with Tier 1 ratios below (above) the sample median are included in the low (high) Tier 1 group. This corresponds to 874 and 881 bank-year observations related to 60 and 61 banks in low and high Tier 1 group, respectively. As shown in Panel B in Table 4.12, for the banks with low Tier 1 ratios, the coefficient on book value of equity (earnings) tends to decrease (increase) following the mandatory adoption of IFRS, which is in line with the main findings. Turning to the parameter of interest, the explanatory power of the price model, a proxy for the value relevance of accounting information, significantly increases from 0.233 for the period of pre-IFRS adoption to 0.568 after the mandatory introduction of IFRS. For the group of high Tier 1 ratio, the coefficient on book value of equity increases, while that on earnings decreases after IFRS adoption. In terms of the explanatory power, within R^2 , it increases from 0.520 for the pre-IFRS adoption period to over 0.66 in the period of IFRS adoption. The difference is statistically significant, suggesting an increase in the combined value relevance of book value of equity and

⁹¹ It is worth mentioning that increasing loan loss provisions causes a reduction in reported net income, and therefore, in Tier 1 capital, but the loan loss reserves can be added to Tier 2 (up to 1.25% of risk-weighted assets) to calculate the total regulatory capital according to the recommendation of Basel II which was implemented by the European bank regulators in January 2008.

earnings. In sum, both low and high Tier 1 groups support the general pattern of an increase in accounting information quality following IFRS adoption.

Table 4. 12 The impact of IFRS on value relevance: Segmentations based on size and Tier 1 ratio

		Panel A Financial Firms (incl. Banks)				Panel B Banks (only)			
VARIABLES	Coeff.	Small firms		Large firms		Low Tier 1		High Tier 1	
		Pre-IFRS (1998- 2004)	IFRS (2005- 2012)	Pre-IFRS (1998- 2004)	IFRS (2005- 2012)	Pre-IFRS (1998- 2004)	IFRS (2005- 2012)	Pre-IFRS (1998- 2004)	IFRS (2005- 2012)
<i>BVPS</i>	b_1	0.00940 (0.0347)	-0.0338 (0.0528)	0.0960*** (0.0237)	0.0347 (0.0577)	0.186* (0.106)	-0.189 (0.197)	0.0401 (0.0822)	0.385 (0.245)
<i>EPS</i>	b_2	2.716*** (0.428)	2.348*** (0.541)	0.420** (0.209)	2.511*** (0.797)	1.644 (1.039)	3.851* (2.179)	4.595*** (1.142)	4.133*** (0.751)
<i>Constant</i>	b_0	30.68*** (4.051)	34.67*** (3.735)	52.86*** (4.089)	16.08*** (5.293)	36.86*** (9.416)	27.43*** (3.605)	14.50*** (4.005)	16.82* (9.863)
Year dummy D_t		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		647	772	616	764	402	472	401	480
No of firms		97	97	97	97	60	60	61	61
R ² (within)		0.524	0.514	0.160	0.463	0.233	0.568	0.520	0.663
Difference		-0.011		0.303***		0.335***		0.143**	

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the fixed effect estimation of the price model as follows: $P_{it} = b_0 + b_1 BVPS_{it} + b_2 EPS_{it} + \delta D_t + \varepsilon_{it}$, where P_{it} is the market value per share of firm i three months following the end of fiscal year t . $BVPS_{it}$ is the book value of equity per share for firm i at the end of fiscal year t . EPS_{it} is the reported earnings per share of firm i over the fiscal year t and D_t are year dummy variables. The difference in the value relevance of accounting information between pre-IFRS adoption period (1998-2004) and IFRS adoption period (2005-2012) is measured by the difference in the within explanatory power of price model, within R^2 , over the two periods. The significance of the difference in within R^2 is tested based on Z statistics = $(R_{post}^2 - R_{pre}^2) / (\sigma_{R_{post}^2}^2 + \sigma_{R_{pre}^2}^2)^{0.5}$ where $\sigma_{R_{post}^2}^2$ and $\sigma_{R_{pre}^2}^2$ are the variance of coefficients of determinations of the within-group estimator using bootstrap methods following Agostino et al. (2011: 444). The results are reported for the entire main sample of financial firms in Panel A and for the sub-sample of banks in Panel B. Financial firms are classified as either large or small firms based on the median value of total assets over the study period. Banks are classified to either high or low Tier 1 banks based on the median value of Tier 1 ratio over the period (2005-2012). Due to missing values of Tier 1 ratio for some banks in Bankscope, the sum of observations is lower than the total number of observations reported in previous analyses for the sub-sample of banks.

Similarly, the impact of the crisis period on the valuation roles of the balance sheet and the income statement is re-examined using subsamples partitioned by firm size as well as Tier 1 capital ratio in Table 4.13. In panel A, the coefficient on the crisis dummy variable is negative and significantly differs from zero for both the small and large firms (772 and 764 observations, respectively), suggesting a decrease in market value per share in the crisis period. The coefficient on book value of equity before the crisis period (i.e. b_2) is negative for both groups and only significant at the 0.10 level for small financial firms. The interaction between the crisis and book value of equity is positive and statistically significant at the 0.05 level for the small financial

firms, suggesting a significant positive impact of financial crisis on the value relevance of balance sheet figures of small firms. The interaction between the crisis and the book value of equity is significant only at the 0.10 level for large firms, indicating that the value relevance of their balance sheet marginally increases during the crisis. The estimated coefficient on earnings per share is positive and statistically significant for both small and large financial firms. Finally, the interaction between the crisis and earnings is negative for both groups. Whereas it is significant at the 0.01 level for the small firms group, it is only significant at the 0.10 level for large financial firms. Again, this suggests a marginal effect of financial crisis on the value relevance of the income statement numbers for large financial firms. Overall, the impact of financial crisis on valuation roles of the balance sheet and the income statement appears to be more pronounced for smaller financial firms.

Moving to banks breakdown into low and high Tier 1 capital ratio banks (472 and 480 observations, respectively), as shown in Panel B, the significant negative coefficient on the crisis shows the decline in the market value of equity during the crisis period for both groups. The book value of equity before the crisis, b_2 , is negative and statistically significant for banks with low Tier 1, which is consistent with the results obtained for the entire subsample of banks. For high Tier 1 banks, the valuation coefficient on equity book value prior the crisis is positive and statistically significant only at the 0.10 level. The interaction between the crisis and book value of equity, b_3 , is negative; however, it is statistically significant only for banks with low Tier 1 ratios. The valuation coefficient on earnings before the crisis period (i.e. b_4) is significant and positive for both groups. The second coefficient of interest, the interaction between the crisis and earnings, is negative but statistically significant only for the group of banks with low Tier 1 ratios. That is, the value relevance of equity book value tends to increase, while that of earnings to decrease during the crisis period for low Tier 1 banks. In contrast, the crisis has insignificant impact on the value relevance of book value of equity and net income for high Tier 1 banks. This

could be explained by the higher incentive for banks with low Tier 1 ratios to manipulate accounting numbers, such as earnings management via loan loss provisions, during the crisis period in order to meet the capital requirement.

Table 4. 13 The impact of the crisis on value relevance: Segmentations based on size and Tier 1 ratio

VARIABLES	Coeff.	Panel A Financial Firms (incl. Banks)		Panel B Banks (only)	
		Small firms	Large firms	Low Tier 1	High Tier 1
<i>Crisis</i>	b_1	-23.55*** (4.947)	-14.87*** (2.524)	-14.78*** (3.447)	-19.38*** (4.659)
<i>BVPS</i>	b_2	-0.112* (0.0673)	-0.0744 (0.0878)	-0.590*** (0.157)	0.490* (0.279)
<i>Crisis* BVPS</i>	b_3	0.129** (0.0571)	0.186* (0.0985)	0.795*** (0.180)	-0.0325 (0.113)
<i>EPS</i>	b_4	3.412*** (0.842)	4.052*** (1.318)	9.908*** (2.131)	4.269*** (1.414)
<i>Crisis* EPS</i>	b_5	-2.196*** (0.822)	-2.634* (1.379)	-9.781*** (2.293)	-1.502 (1.424)
<i>Constant</i>	b_0	34.64*** (3.487)	12.14** (5.126)	15.70*** (3.103)	11.97 (9.797)
Year dummy D_t		Yes	Yes	Yes	Yes
Observations		772	764	472	480
Number of firms		97	97	60	61
R ² (within)		0.557	0.540	0.727	0.705

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the fixed effect estimation of $P_{it} = b_0 + b_1Crisis + b_2BVPS_{it} + b_3Crisis * BVPS_{it} + b_4EPS_t + b_5Crisis * EPS_{it} + \delta D_t + \varepsilon_{it}$ over the period 2005-2012 where P_{it} is the market value of firm i three months following the end of fiscal year t . $BVPS_{it}$ is the book value of equity per share for firm i at the end of fiscal year t . EPS_t is the reported earnings per share of firm i over the fiscal year t and D_t are year dummy variables. *Crisis* is a dummy variable coded 1 for the years of crisis period (2008-2012) and zero otherwise. Panel A shows the statistics for the entire sample of financial firms and Panel B reports those of the sub-sample of banks. Financial firms are classified as either large or small firms based on the median value of total assets over the study period. Banks are classified to either high or low Tier 1 banks based on the median value of Tier 1 ratio over the period (2005-2012). Due to missing values of Tier 1 ratio for some banks in Bankscope, the sum of observations is lower than the total number of observations reported in previous analyses for the sub-sample of banks.

As a robustness check, equity market value six months, rather than three months, after the end of the fiscal year is used in the price model to evaluate the changes in the value relevance of accounting information following IFRS adoption. Panel A in Table 4.14 shows that for the whole sample of financial firms the within R^2 significantly increases from 0.155 for the pre-IFRS adoption period to 0.503 for the period of IFRS adoption. The sub-sample of banks report a similar pattern where the explanatory power shows an increase from 0.248 for the period before IFRS adoption to more than 0.48 after the mandatory introduction of IFRS, and the difference is

statistically significant. These results confirm those obtained using share price three months after the end of the fiscal year.

Additionally, the main model of value relevance is re-estimated after all the variables are scaled by total assets at the beginning of the fiscal year. A number of previous studies use lagged total assets, rather than the number of outstanding shares, to address the potential scale bias in the price model (e.g. Marquardt and Wiedman, 2004; O'Hanlon and Taylor, 2007; Manganaris et al., 2015). As reported in Table 4.14 Panel B, both the whole sample of financial firms and the subsample of banks show a significant increase in the value relevance of accounting information, as measured by within R^2 after the mandatory adoption of IFRS, which confirms the main results. Also, in Appendix V the main regression to test the impact of IFRS adoption is re-estimated using lagged book value of equity as an alternative scaling method and the main results still hold.

Table 4. 14 The impact of IFRS on value relevance (six month market value and different scaling method)

VARIABLES	Coeff.	Panel A Using Six Month Market Value				Panel B Scaled by Lagged Total Assets			
		Financial firms (incl. Banks)		Banks (only)		Financial firms (incl. Banks)		Banks (only)	
		Pre-IFRS (1998-2004)	IFRS (2005-2012)	Pre-IFRS (1998-2004)	IFRS (2005-2012)	Pre-IFRS (1998-2004)	IFRS (2005-2012)	Pre-IFRS (1998-2004)	IFRS (2005-2012)
<i>BVPS</i>	b_1	0.135 (0.121)	-0.0159 (0.0406)	0.0905 (0.0866)	-0.0409 (0.0409)	0.967*** (0.168)	1.346*** (0.120)	0.670*** (0.213)	1.115*** (0.141)
<i>EPS</i>	b_2	1.670** (0.736)	2.355*** (0.445)	2.200*** (0.705)	2.413*** (0.518)	5.713*** (1.317)	0.615* (0.347)	3.005*** (1.070)	1.066 (0.881)
<i>Constant</i>	b_0	46.72*** (5.963)	26.29*** (2.803)	31.96*** (5.319)	28.42*** (4.051)	0.0845* (0.0459)	0.0901*** (0.0233)	0.128*** (0.0258)	0.0883*** (0.0145)
Year dummy D_t		Yes	Yes	yes	yes	Yes	Yes	Yes	Yes
Observations		1,263	1,536	963	1,168	1,248	1,536	951	1,168
No of firms		194	194	148	148	194	194	148	148
R^2 (within)		0.155	0.503	0.248	0.483	0.403	0.601	0.251	0.546
Difference		0.348***		0.265***		0.198***		0.295***	

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the fixed effect estimation of the price model as follows: $P_{it} = b_0 + b_1 BVPS_{it} + b_2 EPS_{it} + \delta D_t + \varepsilon_{it}$. In Panel A P_{it} is the market value per share of firm i six months following the end of fiscal year t . $BVPS_{it}$ is the book value of equity per share for firm i at the end of fiscal year t . EPS_{it} is the reported earnings per share of firm i over the fiscal year t and D_t are year dummy variables. In Panel B P_{it} is the market value of firm i three months following the end of fiscal year t . $BVPS_{it}$ is the book value of equity for firm i at the end of fiscal year t . EPS_{it} is the reported earnings of firm i over the fiscal year t and D_t is a dummy variable for year t . P_{it} , $BVPS_{it}$, and EPS_{it} are scaled by total assets at the beginning of year t .

The difference in the value relevance of accounting information between pre-IFRS adoption period (1998-2004) and IFRS adoption period (2005-2012) is measured by the difference in the within explanatory power of price model, within R^2 , over the two periods. The significance of the difference in within R^2 is tested based on Z statistics = $(R_{post}^2 - R_{pre}^2) / (\sigma_{R_{post}^2}^2 + \sigma_{R_{pre}^2}^2)^{0.5}$ where $\sigma_{R_{post}^2}^2$ and $\sigma_{R_{pre}^2}^2$ are the variance of coefficients of determinations of the within-group estimator using bootstrap methods following Agostino et al. (2011: 444). The results are reported for the entire sample of financial firms and for a sub-sample of banks.

Similarly, the price model to investigate the impact of the crisis period on the value relevance of book value of equity and earnings is re-estimated using the market value per share six months, in lieu of three months, after the end of the fiscal year as a dependant variable. The results of this robustness test, as shown in Panel A of Table 4.15, are in line with the main findings for both the entire sample of financial firms and the sub-sample of banks. The estimated coefficient on the interaction between the crisis and book value of equity is positive and significant, while that on the interaction between the crisis and earnings is negative and statistically significant.

Furthermore, the main model to test the impact of the crisis on the value relevance of accounting information is re-estimated after all the variables are divided by total assets at the beginning of the fiscal year. Panel B in Table 4.15 reports that the impact of the financial crisis on the value relevance of the book value of equity appears to be insignificant for both the whole sample of financial firms and the sub-sample of banks (i.e. b_3). On the other hand, the estimated coefficient on the interaction between the crisis and earnings, b_5 , is negative and statistically significant, again for both the whole sample of financial firms and the banks sub-sample. That is, the results using lagged total assets as to scale the variables supports the main findings on the negative influence of the crisis period on the value relevance of income statement information, but not on that concerning the balance sheet figures.⁹²

⁹² Similar findings are reported for using lagged book value of equity to scale all the variables in Appendix V.

Table 4. 15 The impact of the crisis on value relevance (robustness check)

VARIABLES	Coeff.	Panel A Using Six Month Market Value		Panel B Scaled by Lagged Total Assets	
		Financial Firms (incl. Banks)	Banks (only)	Financial Firms (incl. Banks)	Banks (only)
<i>Crisis</i>	b_1	-17.01*** (2.628)	-18.00*** (2.751)	-0.114*** (0.0177)	-0.0801*** (0.0250)
<i>BVPS</i>	b_2	-0.0906 (0.0592)	-0.163** (0.0695)	1.302*** (0.132)	0.890*** (0.189)
<i>Crisis</i> * <i>BVPS</i>	b_3	0.134** (0.0523)	0.204*** (0.0655)	0.0833 (0.0761)	-0.0795 (0.319)
<i>EPS</i>	b_4	3.361*** (0.757)	4.404*** (0.924)	1.374** (0.564)	3.446** (1.494)
<i>Crisis</i> * <i>EPS</i>	b_5	-2.044*** (0.770)	-3.021*** (0.979)	-1.279** (0.642)	-3.956*** (1.521)
<i>Constant</i>	b_0	24.99*** (2.506)	23.10*** (3.441)	0.0819*** (0.0219)	0.0774*** (0.0133)
Year dummy D_t		Yes		Yes	Yes
Observations		1,536	1,168	1,536	1,168
Number of firms		194	148	194	148
R ² (within)		0.523	0.545	0.608	0.599

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the fixed effect estimation of $P_{it} = b_0 + b_1Crisis + b_2BVPS_{it} + b_3Crisis * BVPS_{it} + b_4EPS_t + b_5Crisis * EPS_{it} + \delta D_t + \varepsilon_{it}$ over the period 2005-2012, where *Crisis* is a dummy variable coded 1 for the years of crisis period (2008-2012) and zero otherwise. In Panel A P_{it} is the market value per share of firm i six months following the end of fiscal year t . $BVPS_{it}$ is the book value of equity per share for firm i at the end of fiscal year t . EPS_{it} is the reported earnings per share of firm i over the fiscal year t and D_t are year dummy variables. In Panel B P_{it} is the market value of firm i three months following the end of fiscal year t . $BVPS_{it}$ is the book value of equity for firm i at the end of fiscal year t . EPS_{it} is the reported earnings of firm i over the fiscal year t and D_t are year dummy variables. P_{it} , $BVPS_{it}$, and EPS_{it} are scaled by total assets at the beginning of year t . The results are reported for the entire sample of financial firms and for a sub-sample of banks.

An alternative way to measure the overall value relevance is the explanatory power of the return model. As explained in Chapter 3, the return model is the regression of stock return on earnings and change in earnings, where the explanatory variables are scaled by the market value of equity at the beginning of the fiscal year. Table 4.16 reports that for the whole sample of financial firms and the sub-sample of banks the coefficient on earnings decreases after the introduction of IFRS, however it is statistically significant at the 0.05 level only in the pre-IFRS adoption period. The valuation coefficient on change in earnings decreases following IFRS adoption and is statistically significant for both periods for the whole sample of financial firms. For the sub-sample of banks the coefficient on change in earnings decreases after IFRS adoption and it is significant at the 0.05 level only in the period of IFRS adoption. More importantly, the whole sample of financial

firms and the sub-sample of banks show that the explanatory power (within R^2) is significantly higher during the period of IFRS adoption compared to the pre-IFRS adoption period. These results support the main findings of an increase in the value relevance of accounting information, measured using the price model, following the mandatory adoption of IFRS.

Table 4. 16 The impact of IFRS adoption on value relevance (using the return model)

VARIABLES	Coeff.	Panel A Financial Firms			Panel B Banks		
		Pooled (1998- 2012)	Pre-IFRS (1998-2004)	IFRS (2005-2012)	Pooled (1998-2012)	Pre IFRS (1998-2004)	IFRS (2005-2012)
<i>EPS</i>	b_1	-0.0718 (0.0508)	0.566** (0.250)	-0.143* (0.0729)	-0.0687 (0.0691)	0.543** (0.275)	-0.134 (0.0992)
ΔEPS	b_2	0.404*** (0.101)	0.475** (0.218)	0.324*** (0.109)	0.375*** (0.123)	0.355* (0.182)	0.309** (0.140)
<i>Constant</i>	b_0	0.321*** (0.0458)	0.221*** (0.0485)	0.171*** (0.0485)	0.265*** (0.0461)	0.160*** (0.0463)	0.165** (0.0586)
Year dummy D_t		Yes	Yes	Yes	Yes	Yes	Yes
Observations		2,415	1,073	1,342	1,837	817	1,020
No of firms		194	194	194	148	148	148
R^2 (within)		0.303	0.238	0.370	0.347	0.256	0.415
Difference			0.132***			0.159***	

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the fixed effect estimation of the return model as follows: $R_{it} = b_0 + b_1 EPS + b_2 \Delta EPS_{it} + \delta D_t + \varepsilon_{it}$, where R_{it} is the stock return of financial firm i at year t as measured three months after fiscal year end. EPS_t is the reported earnings of firm i over the fiscal year t scaled by the market value three months after the end of fiscal year $t-1$. ΔEPS_t is the change in reported earnings of firm i between the fiscal year t and $t-1$ scaled by the market value three months after the end of fiscal year $t-1$ and D_t are year dummy variables. The difference in the value relevance of accounting information between pre-IFRS adoption period (1998-2004) and IFRS adoption period (2005-2012) is measured by the difference in the within explanatory power of price model, within R^2 , over the two periods. The significance of the difference in within R^2 is tested based on Z statistics $= (R_{post}^2 - R_{pre}^2) / (\sigma_{R_{post}^2}^2 + \sigma_{R_{pre}^2}^2)^{0.5}$ where $\sigma_{R_{post}^2}^2$ and $\sigma_{R_{pre}^2}^2$ are the variance of coefficients of determinations of the within-group estimator using bootstrap methods following Agostino et al. (2011: 444). The results are reported for the entire sample of financial firms in Panel A and for the sub-sample of banks in Panel B.

Finally, the voluntary IFRS adopters have been excluded from the sample, which might introduce a selection bias when estimating the impact of financial crisis on the value relevance of equity book value and earnings. As a sensitivity test, the voluntary adopters are included in the sample to evaluate the influence of the crisis on the value relevance of accounting information.⁹³ Table 4.17 shows that for the whole sample of financial firms, the valuation coefficient on the book

⁹³ Also, the financial firms with no data in pre-IFRS adoption period, which has been excluded in the main analysis, are included in this robustness check.

value of equity, b_2 , is not statistically significant. The coefficient on the interaction between the crisis variable and book value, $b_3 = 0.206$ is positive and statistically different from zero at the 0.01 level, suggesting an increase in the value relevance of book value of equity when the crisis hits. The estimated coefficient on earnings, b_4 , is positive and statistically significant, reflecting the valuation on the reported earnings prior to the crisis. The impact of the crisis period on earnings $b_5 = -3.111$ is negative and statistically significant at the 0.01 level. The results of sub-sample of banks in Panel B confirm this general pattern. Overall, including the voluntary IFRS adopters supports the main findings on the impact of financial crisis on the value relevance of accounting information. In particular, the value relevance of balance sheet numbers tends to increase, while that of income statement to decrease as the financial crisis evolves.

Table 4. 17 The impact of the crisis on value relevance (including voluntary IFRS adopters)

VARIABLES	Coeff.	Panel A Financial Firms (incl. Banks)	Panel B Banks (only)
<i>Crisis</i>	b_1	-20.98*** (2.799)	-22.47*** (2.788)
<i>BVPS</i>	b_2	-0.0337 (0.0780)	-0.145** (0.0656)
<i>Crisis* BVPS</i>	b_3	0.206*** (0.0739)	0.204*** (0.0657)
<i>EPS</i>	b_4	4.059*** (0.991)	3.392*** (0.934)
<i>Crisis* EPS</i>	b_5	-3.111*** (1.123)	-3.110*** (0.998)
<i>Constant</i>	b_0	20.19*** (3.200)	32.57*** (2.230)
Year dummy D_t		Yes	Yes
Observations		2,150	1,612
Number of firms		277	208
R ² (within)		0.655	0.477

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the fixed effect estimation of $P_{it} = b_0 + b_1Crisis + b_2BVPS_{it} + b_3Crisis * BVPS_{it} + b_4EPS_t + b_5Crisis * EPS_{it} + \delta D_t + \varepsilon_{it}$ over the period 2005-2012 where P_{it} is the market value of firm i three months following the end of fiscal year t . $BVPS_{it}$ is the book value of equity per share for firm i at the end of fiscal year t . EPS_t is the reported earnings per share of firm i over the fiscal year t and D_t are year dummy variables. *Crisis* is a dummy variable coded 1 for the years of crisis period (2008-2012) and zero otherwise. Panel A shows the statistics for the entire sample of financial firms and Panel B reports those of the sub-sample of banks.

4.7 Conclusion

This chapter presents and discusses the findings on the first empirical part that addresses the impact of IFRS adoption and the financial crisis on the value relevance of accounting information. Particularly, it tests whether there has been an improvement in the overall value relevance of book value of equity and earnings of financial firms following the mandatory adoption of IFRS in 2005. Then, it evaluates whether the value relevance shifts from earnings to equity book values when the financial crisis evolves. Finally, the valuation of book value of equity and earnings during the crisis period is assessed as a function of both the institutional environment and corporate governance.

The results of this study support the view that the value relevance of accounting information has increased following mandatory IFRS adoption. The explanatory power of the price model is significantly higher for the IFRS adoption period compared to the pre-IFRS adoption period. The results are consistent for the whole sample of financial firms (which includes banks) and the separate sub-sample of banks. These empirical findings are in line with those obtained by prior studies reporting an increase in accounting information quality after mandating IFRS (e.g. Filip, 2010; Devalle et al., 2010; Liu et al., 2011).

With regard to the impact of the financial crisis, the valuation coefficient on the interaction between the financial crisis and book value of equity is positive and statistically significant, while that on the interaction between the crisis and earnings is significantly negative for both the main sample of financial firms and the sub-sample of banks. In other words, the findings suggest that the value relevance of book value of equity increases, whereas that of net income decreases when the financial crisis hit the countries under investigation. These results are comparable to those of previous research showing that there is a change in the valuation roles of the balance sheet and the income statement as a function of firm's financial health and the deterioration in the economic environment (Barth et al., 1998a; Graham et al., 2000; Davis-Friday et al., 2006). In a further

analysis, the valuation of the book value of equity and earning in the crisis period is tested as a function of the institutional environment. The results show that a weak institutional environment is associated with more value relevant book value of equity during the financial crisis. The impact on earnings appears to be marginal. In the same spirit, the valuation of equity book value and earning in the crisis period is examined as a function of firm-level corporate governance mechanisms. The findings suggest that investors tend to place higher valuation weight on the book value of equity during the crisis period for firms with weak corporate governance mechanisms, whereas the impact of corporate governance on earnings tend to be insignificant. Overall, there is a consistency in the results from the whole sample of financial firms and the subsample of banks.

As an additional analysis, the whole sample of financial firms is partitioned into small and large firms based on total assets. For the small firms, the value relevance of accounting information, measured by the explanatory power of the price model, appears to be unchanged after IFRS adoption. The results for large firms confirm the general pattern of increasing value relevance of accounting information following mandatory IFRS adoption. With regard to the impact of financial crisis, the increase (decrease) in the value relevance of book value of equity (net income) seems to be more apparent for small financial firms.

In a second segmentation the subsample of banks is partitioned into low and high Tier 1 ratio banks. For both groups, the value relevance of financial statement information significantly increases after mandating IFRS. Interestingly, while the low Tier 1 ratio group confirms the general pattern of increase in the value relevance of equity book value as opposite to decrease in the value relevance of net income when the financial crisis hit, the results for banks with higher Tier 1 ratios suggest no significant change in the value relevance of both book value of equity and net income.

Finally, the main results are largely robust to alternative scaling method and to use market value of equity six months after the end of fiscal year as a dependent variable. Also, the main findings tend to be confirmed when using the return model in examining the impact of IFRS adoption, as well as after including the voluntary IFRS adopter in evaluating the effect of the financial crisis.

Chapter 5: Findings and Discussion on the Value Relevance of Fair Value Hierarchy

5.1 Introduction

This chapter is devoted to present and discuss the findings on the second empirical part of this thesis which addresses the value relevance of fair value hierarchy under IFRS 7. The chapter starts with Section 5.2 showing the descriptive statistics on the variables used to test the hypotheses. Then, Section 5.3 presents the results on testing the value relevance of the three levels of fair value. Section 5.4 provides the empirical findings on the impact of a country's institutional environment as well as a firm's corporate governance attributes on the value relevance of fair value hierarchy. Section 5.5 offers additional analyses and robustness checks of the main empirical findings. Finally, section 5.6 concludes the chapter.

5.2 Descriptive statistics

Table 5.1 provides the descriptive statistics on the variables used to evaluate the value relevance of fair value hierarchy. For the sake of comparison with previous studies, Panel A presents the summary statistics on the relative size of fair value assets and liabilities (rather than fair value net assets as used in the analysis). On average, 71.85 % of a firm's total assets and 90.58% of total liabilities are non-fair value assets and liabilities. Put differently, less than 29% of total assets and 10% of total liabilities are measured at fair value. This percentage of assets measured at fair value is higher than that recently reported for US financial firms; for example the sample of Goh et al. (2015) reports that the average relative size of assets marked at fair value is less than 22% over the period 2008-2011. In addition, the sample of European financial firms in this study shows that, on average, level 1, level 2, and level 3 fair value assets comprise 15.19%, 10.22% and 2.74% of the total assets of financial firms, respectively. That is, unlike the case of US financial firms where the fair value amounts based on level 2 inputs account for the majority of fair

values,⁹⁴ most of the fair value assets of EEA and Swiss firms are classified as level 1 assets. Moving to the liabilities, the average of relative fair value liabilities is less than 10%,⁹⁵ which is higher than the percentages for US firms, 0.37% and 1.95% as reported by Song et al. (2010) and Goh et al. (2015), respectively. Furthermore, the sample of European financial firms in this thesis shows that the mean of relative level 1, level 2, and level 3 fair value liabilities are 1.56%, 7.35%, and 0.52% of total liabilities, respectively. This indicates that the majority of fair value liabilities are measured using level 2 valuation inputs, which is line with the descriptive statistics in the US context (i.e. Song et al., 2010). Examples of level 2 fair values are when an asset (liability) is measured using quoted prices of comparable items traded in active markets or quoted prices of identical assets (liabilities) traded in inactive markets.

Panel B shows the means relative size of fair value assets and liabilities (as well as relative non-fair value assets and liabilities) for each year from 2009 to 2012. The average of total non-fair assets (liabilities) slightly decreases from 72.69% (90.74%) in 2009 to 70.59% (90.44%) in 2012, suggesting a marginal change in the use of fair value accounting over the sample period. The relative size of level 1 and 3 fair values increases in 2012 relative to the first year in the sample. In contrast, the mean relative level 2 fair value assets (liabilities) slightly decreases from 10.98% (7.79%) to in 2009 to 10.48% (7.15%) in 2012, indicating a marginal decrease in in firms' holdings of level 2 financial instruments.

Panel C presents the descriptive statistics for the fair value figures and earnings on a per share basis as used in the model. To mitigate the influence of outliers on our inferences, all the variables are winsorised at 1% and 99%. The mean of non-fair value net assets per share is -42.71 indicating that, on average, non-fair value liabilities are greater than non-fair assets.

⁹⁴ See Table 2 in Song et al. (2010) and Table 2 in Goh et al. (2015).

⁹⁵ This is because 90.58% of total liabilities are not marked at fair value.

Table 5. 1 Descriptive Statistics on fair value hierarchy
Panel A: Relative size of fair value assets and liabilities (pooled data, 2009-2012)

Variables	N	Mean	Std. Dev.	25 th Percentile	Median	75 th Percentile
<i>Non-FVA/Total Assets</i>	699	71.85%	24.02%	59.57%	78.57%	89.02%
<i>FVA1/Total Assets</i>	699	15.19%	19.29%	3.83%	9.48%	17.62%
<i>FVA2/Total Assets</i>	699	10.22%	13.19%	0.95%	5.22%	13.57%
<i>FVA3/Total Assets</i>	699	2.74%	9.53%	0.07%	0.41%	1.38%
<i>Non-FVL/Total Liabilities</i>	699	90.58%	15.76%	87.95%	97.84%	99.80%
<i>FVL1/Total Liabilities</i>	699	1.56%	6.68%	0.00%	0.00%	0.53%
<i>FVL2/Total Liabilities</i>	699	7.35%	12.25%	0.12%	1.60%	9.68%
<i>FVL3/Total Liabilities</i>	699	0.52%	5.27%	0.00%	0.00%	0.04%

Panel B The mean relative size of fair value assets and liabilities over the sample period

Variables	2009	2010	2011	2012
<i>Non-FVA/Total Assets</i>	72.69%	71.74%	72.46%	70.59%
<i>FVA1/Total Assets</i>	14.25%	15.50%	14.85%	16.07%
<i>FVA2/Total Assets</i>	10.98%	9.69%	9.81%	10.48%
<i>FVA3/Total Assets</i>	2.07%	3.06%	2.88%	2.87%
<i>Non-FVL/Total Liabilities</i>	90.74%	90.94%	90.23%	90.44%
<i>FVL1/Total Liabilities</i>	1.26%	1.47%	1.73%	1.73%
<i>FVL2/Total Liabilities</i>	7.79%	7.01%	7.46%	7.15%
<i>FVL3/Total Liabilities</i>	0.22%	0.58%	0.57%	0.68%

Panel C Fair value net assets, non-fair value net assets and earnings (on a per share basis)

Variables	N	Mean	Std. Dev.	25 th Percentile	Median	75 th Percentile
<i>P</i>	699	16.07	38.85	1.21	3.63	15.18
<i>NFVNA</i>	699	-42.71	271.54	-13.05	-1.07	0.71
<i>FVNA1</i>	699	37.83	108.39	0.46	4.28	21.42
<i>FVNA2</i>	699	10.14	50.83	0.00	0.22	5.20
<i>FVNA3</i>	699	10.16	91.73	0.00	0.10	0.74
<i>EPS</i>	699	1.04	9.20	0.02	0.19	0.92

Panel D Correlation matrix

	<i>P</i>	<i>NFVNA</i>	<i>FVNA1</i>	<i>FVNA2</i>	<i>FVNA3</i>	<i>EPS</i>
<i>P</i>	1					
<i>NFVNA</i>	(0.001) 0.9879	1				
<i>FVNA1</i>	0.6308 (0.000)	-0.3653 (0.000)	1			
<i>FVNA2</i>	0.1472 0.0001	-0.5075 (0.000)	0.0322 0.3951	1		
<i>FVNA3</i>	0.0879 0.0202	-0.7025 (0.000)	0.0785 0.0381	0.3931 (0.000)	1	
<i>EPS</i>	0.4814 (0.000)	-0.1606 (0.000)	0.3143 (0.000)	0.2492 (0.000)	0.1256 0.0009	1

Notes: Panel A presents descriptive statistics of the relative size of fair value assets and liabilities by level under IFRS7. *FVA1*, *FVA2*, and *FVA3* indicate fair value of level 1, level 2 and level 3 assets. Similarly, *FVL1*, *FVL2*, and *FVL3* are fair values of level 1, level 2 and level 3 liabilities. *Non-FVA* and *Non-FVL* are non-fair value assets and liabilities, respectively.

Panel B provides the mean of the relative size of fair value assets and liabilities by level as well as non-fair value assets and liabilities for each year from 2009 to 2012.

Panel C provides descriptive statistics on the variables that are used in this study, where all the variables are scaled by the number of outstanding common share. *P* is the market value of equity and *NFVNA* is non-fair value net assets. *FVNA1*, *FVNA2* and *FVNA3* are fair value of level 1, level 2 and level 3 net assets. Finally, *EPS* is the reported net income.

Panel D shows Pearson correlation coefficients among *P*, *FVNA1*, *FVNA2*, *FVNA3* and *EPS*. The numbers in parentheses are p-values.

The mean fair value net assets using level 1 valuation inputs (*FVNA1*), level 2 inputs (*FVNA2*), and level 3 inputs (*FVNA3*) are 37.83, 10.14, and 10.16, respectively. Level 1 fair value net assets amount for most of fair value net assets. These summary statistics on net assets per share basis are comparable to those reported by Kolev (2009); however for US firms level 2 fair values represent most of fair value net assets.

Panel D in Table presents the Pearson correlation among the variables used in testing the value relevance of fair value hierarchy. As shown in the table, the correlation between market value of equity (*P*) and *FVNA3* is lower than the corresponding correlations between *P* and *FVNA1* and between *P* and *FVNA2*. In Specific, *P* has Pearson correlation of 0.6308, 0.1472 and 0.0879 with *FVNA1*, *FVNA2* and *FVNA3*, respectively. These correlations indicate that the market value of equity is positively associated with fair value net assets and the association tends to be weaker for level 3 fair values than for level 1 and level 2 fair values.

Table 5.2 provides the mean values of the five institutional environment factors used in the second set of analyses. The institutional environment variables are: *Efficacy of corporate boards*, *Strength of auditing and reporting standards*, *Protection of minority interests*, *Regulation of securities exchanges* and *Judicial independence*.⁹⁶ As pointed out in Chapter 3, the institutional variables are coded in the Global Competitiveness Report from 1, indicating weak institutional setting, to 7, which presents strong institutional environment. In terms of *Efficacy of corporate*

⁹⁶ The institutional environment variables and their expected impact on the quality of accounting information are discussed in details in Section 3.2.4.

boards, Italy, Greece and Bulgaria appear to have the lowest scores under 4, while Sweden, Norway and Finland have the highest scores, equal or more than 5.50.

Table 5. 2 The mean values of institutional environment variables

country	<i>Efficacy of corporate boards</i>	<i>Strength of auditing & reporting Standards</i>	<i>Protection of minority interests</i>	<i>Regulation of securities exchanges</i>	<i>Judicial independence</i>
Austria	5.13	5.78	4.99	4.75	5.65
Belgium	5.11	5.63	4.97	4.96	5.26
Bulgaria	3.99	4.30	3.60	3.62	2.93
Cyprus	4.05	5.56	5.15	4.83	5.29
Denmark	5.32	5.64	5.39	5.47	6.37
Finland	5.50	6.20	5.95	5.80	6.43
France	5.10	5.50	4.75	5.25	4.85
Germany	5.23	5.55	5.08	4.88	6.05
Greece	3.96	4.64	4.72	4.22	3.42
Hungary	4.42	5.28	4.06	4.80	3.82
Ireland	4.63	4.63	4.68	4.15	6.80
Italy	3.93	4.18	3.58	4.23	3.72
Lithuania	4.92	5.04	3.96	4.50	3.52
Luxemburg	5.28	5.83	5.10	5.75	5.95
Malta	4.55	5.93	5.23	5.45	5.05
Netherland	5.35	5.93	5.25	5.35	6.35
Norway	5.55	6.00	5.75	5.83	6.27
Poland	4.42	5.13	4.17	4.98	4.23
Portugal	4.28	4.90	4.48	4.85	4.20
Romania	4.30	4.33	3.85	3.73	3.10
Slovakia	4.66	4.55	3.96	3.99	2.85
Slovenia	4.13	5.00	3.55	4.10	3.83
Spain	4.36	4.85	4.25	3.78	3.94
Sweden	5.83	6.15	5.90	5.83	6.45
Switzerland	5.33	5.60	4.82	5.65	6.37
UK	5.26	5.84	5.18	5.07	6.16

Source: Global Competitiveness Report 2009 – 2012 issued by World Economic Forum.

Notes: *Efficacy of corporate boards* measures how corporate governance is characterised by investors and boards of directors in a country [1 = management has little accountability to investors and boards; 7 = investors and boards exert strong supervision of management decisions). *Strength of auditing and reporting standards* measures how financial auditing and reporting standards is assessed regarding company financial performance [1 = extremely weak; 7 = extremely strong]. *Protection of minority interests* assesses to what extent the interests of minority shareholders are protected by the legal system [1 = not protected at all; 7 = fully protected]. *Regulation of securities exchanges* is an assessment for the regulation and supervision of securities exchanges [1 = ineffective; 7 = effective]. *Judicial independence* measures to what extent the judiciary is independent from influences of members of government, citizens, or firms [1 = heavily influenced; 7 = entirely independent].

Concerning *Strength of auditing and reporting standards*, Italy (4.18), Bulgaria (4.30) and Romania (4.33) show the lowest values, whereas Norway, Sweden and Finland have values equal

or more than 6. Slovenia (3.55), Italy (3.58) and Bulgaria (3.60) seem to have the lowest level of *Protection of minority interests* in Europe. At the other extreme, Finland (5.95), Sweden (5.90) and Norway (5.75) have the strongest *Protection of minority interests*. Moving to *Regulation of securities exchanges*, Bulgaria (3.62), Romania (3.73), and Spain (3.78) report the lowest scores, while Norway (5.83), Sweden (5.83) and Finland (5.80) have the highest scores. Finally, Slovakia and Bulgaria tend to have the least independent judiciary in the countries under study with scores less than 3, whereas Ireland (6.80), Sweden (6.45), Finland (6.43) have the highest level of *Judicial independence*. Noticeably, Norway, Sweden and Finland consistently appear at the top of countries list in terms of the strength of institutional environment.

Table 5.3 shows the descriptive statistics on governance factors used in examining the impact of corporate governance on the value relevance of fair value hierarchy. Using firms' annual reports and corporate governance reports, the data are hand-collected for five variables. Firstly, *Board meeting* is the number of annual meetings held by the board of directors and its average is 10.99 meetings per year. The board meetings range from 3.50 to 29.25 meetings per annum.

Table 5. 3 Descriptive statistics on corporate governance variables

VARIABLES	Mean	Std. Dev.	Min	25th Percentile	Median	75th Percentile	Max	N
<i>Board meeting</i>	10.99	5.65	3.5	6.75	9.75	14.25	29.25	539
<i>Audit size</i>	4.05	1.2	2	3	4	5	9.75	539
<i>Audit meeting</i>	6.48	3.82	1	4	5.5	7.75	26.25	539
<i>No of block</i>	2.29	1.4	0	1	2	3	6.75	539
<i>Audit fees</i>	6687.84	13902.08	0.82	337.5	1199.49	3976.9	74452.5	539

Notes: Board meeting is the number of annual board meetings. *Audit size* is the total numbers of directors who serve on the audit committee. *Audit meeting* is the number of annual audit committee meetings. *No of block* is the number of shareholders who hold more than 0.05 of voting rights. *Audit fees* is the audit fees paid by a firm to external auditors, presented in thousands of euros. All the variables are the average of its annual values over the period 2009-2012.

Audit size is the number of directors serving on the audit committee and it ranges from 2 to 9.75, with a mean of 4.05 members. *Audit meeting* is the number of annual meetings held by the audit committee. The average number of audit committee meetings is 6.48, with a minimum of one meeting and a maximum of 26.25 meetings per year. *No of block* is the number of shareholders holding 5% or more of the voting rights and ranges from 0 to 6.75, with an average of 2.29

blockholders. Finally, *audit fees* is the audit fees paid to external auditors with an average of €6687.84 ranging from €0.82 to €74452.50 (in thousands).

5.3 The value relevance of fair value hierarchy

The value relevance of an accounting amount is measured by the valuation coefficient on that amount after controlling for other financial statement information. A significant coefficient indicates that the accounting information is relevant to investors and reliable enough to be reflected in share prices (Barth et al., 2001; Barth and Landsman, 2010). Panel A of Table 5.4 reports the results from the regression of market value of equity on the three levels of fair value hierarchy net assets (*FVNA1*, *FVNA2* and *FVNA3*), in addition to non-fair value net assets (*NFVNA*) and reported earnings (*EPS*).

Non-fair value net assets are considered value relevant to investors when the coefficient on *NFVNA* is positive and statistically significant. Similarly, if investors consider the reported fair value amounts as value relevant, the valuation coefficients on *FVNA1*, *FVNA2*, and *FVNA3* will be positive and significantly different from zero. Table 5.4 reveals that the estimated coefficient on non-fair value net assets is positive and statistically different from zero ($b_1 = 0.112$), indicating their value relevance. Moving to the coefficients of interest, the valuation coefficients on level 1, 2 and 3 fair value net assets are 0.287, 0.223 and 0.182, respectively, and all are significant at the 0.01 level. This suggests that investors deem the three levels of fair value as relevant for valuation purposes; yet there is a decline in the valuation weight on fair value net assets as we move down the three levels of fair value hierarchy. Finally, the coefficient on earnings per share is positive and statistically significant, indicating their relevance for equity valuation. Noticeably, the standard errors of the estimated coefficient on level 3 fair value net assets are larger than those of level 1 fair values, demonstrating that the mark-to-model fair value estimates are noisier than the mark-to-market fair values.

In chapter 3 the thesis discusses that one would expect that the valuation coefficients on the components of book value of equity of financial firms to be close to one, especially for level 1 and level 2 fair values (see section 3.2.3). However, Table 5.4 reveals that the coefficients on the components of book value of equity in general tend to deviate considerably from one. One reason for this deviation could be the scaling method adopted. As a robustness check the thesis uses lagged total assets as an alternative scaling method, which is used in previous studies, such as Marquardt and Wiedman, (2004); O'Hanlon and Taylor (2007) and Manganaris et al. (2015). As reported in Table 5.10 later in this chapter, using lagged total assets to scale the accounting and market variables shows consistent results with those reported based on the number of outstanding shares and the coefficient of the components of book value of equity appear to be close to one, especially for level 1 fair values (i.e. b_2).⁹⁷

In the right hand side of Table 5.4, Panel B provides the results of testing whether the valuation coefficients across fair value levels are equal. The empirical analysis shows that coefficient on *FVNA1* is significantly greater than that on *FVNA3* (F-statistics: 5.48). It also reveals that the valuation coefficient on *FVNA1* is marginally different from that of *FVNA2* (F-statistics: 3.47). The valuation coefficients on *FVNA2* is higher than that on *FVNA3*, but the difference is not statistically different (F-statistics: 0.49). Overall, these results suggest that investors in EEA and Swiss financial firms price mark-to-model fair values net assets (level 3) lower than mark-to-market fair values (i.e. level 1). In particular, investors appear to perceive significant reliability concerns with regard to the valuation of level 3 fair value instruments in comparison to level 1 fair values. The valuation of level 2 fair values fall between those on level 1 and level 3 fair values. However, the difference between the valuation on level 2 and level 3 fair value is not statistically significant. Compared to level 3, level 2 fair value measurements are based on

⁹⁷ Section 4.3 provides a discussion on the different scaling methods.

observable market inputs, and hence they are more reliable. However, investors may not be able to identify how managers use market inputs for level 2 fair values directly.

These findings based on a sample from the EEA countries and Switzerland provide support to those obtained in the United States (US) context suggesting that the value relevance of level 1 fair value amounts is significantly higher than that of level 3 fair values, and the value relevance of level 2 fair values falls between those of level 1 and level 3 fair values (i.e. Kolev, 2009; Song et al., 2010; Goh et al., 2015). It is worth mentioning that the results in previous studies are less clear-cut for level 2 fair values. For example, Goh et al. (2015) report a significant difference between the coefficients on level 1 and level 2 fair values, while Kolev (2009) and Song et al. (2010) find no such significant difference.

As an additional analysis, this study tests whether the coefficients on each of the fair value levels, on the one hand, and non-fair value amounts, on the other hand, are equal. Table 5.4 shows that the estimated coefficient on each of the three levels of fair values is significantly

Table 5. 4 Value relevance of fair values hierarchy under IFRS7

VARIABLES	Panel A		Panel B		
	Coeff.		Test	F-stat	p-value
<i>NFVNA</i>	b_1	0.112*** (0.0203)	$FVNA1 = FVNA3$	5.48	0.0196**
<i>FVNA1</i>	b_2	0.287*** (0.0296)	$FVNA1 = FVNA2$	3.47	0.0631*
<i>FVNA2</i>	b_3	0.223*** (0.0363)	$FVNA2 = FVNA3$	0.49	0.4860
<i>FVNA3</i>	b_4	0.182*** (0.0411)	$FVNA1 = NFVNA$	35.73	0.0001***
<i>EPS</i>	b_5	0.958** (0.373)	$FVNA2 = NFVNA$	7.94	0.0050***
Constant	b_0	5.324*** (1.653)	$FVNA3 = NFVNA$	7.20	0.0074***
Year dummy D_t		Yes			
Observations		699			
No of firms		185			
R-squared		0.696			

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the OLS estimation of the following equation $P_{it} = b_0 + b_1NFVNA_{it} + b_2FVNA1_{it} + b_3FVNA2_{it} + b_4FVNA3_{it} + b_5EPS_{it} + \delta D_t + \varepsilon_{it}$, where P_{it} is the market value per share of firm i three months following the end of fiscal year t . $FVNA1_{it}$, $FVNA2_{it}$ and $FVNA3_{it}$ are fair value of level 1, level 2 and level 3 net assets for firm i as reported at

the end of fiscal year t . EPS_{it} is the reported net income of financial firm i for the fiscal year t and D_t is a dummy variable for year t . All accounting information is scaled by the number of outstanding common share. The sample includes 699 firm-year of 185 distinct firms from the European Economic Area (EEA) and Switzerland over 2009-2012. Panel A shows the results of the regression, while Column B offers F-statistics testing the differences between the estimation coefficients.

greater than that on non-fair value net assets. That is, fair value amounts are more value relevant to investors relative to non-fair value assets and liabilities. This is in line with earlier studies showing that fair value accounting is, in general, more value relevant than other measurement basis (e.g. Barth et al., 1996; Eccher et al., 1996; Carroll et al., 2003).

In sum, the findings of this empirical test suggest that mark-to-model fair value net assets, which is measured based on unobservable inputs (i.e. level 3 fair values), are priced lower than level 1 and level 2 fair values – although the difference is not statistically significant for level 2 – for a sample of European financial firms. This confirms the first hypothesis, *H1B*, which asserts that the value relevance of level 1 and level 2 fair values is higher than that of level 3 fair values. However, the valuation coefficient on level 2 fair values is not statistically different from that on level 3 fair values. Taken into consideration the absence of active market⁹⁸ and higher information risk associated with level 3 fair values relative to mark-to-market net assets, it appears that investors price these fair value values lower given that they are potentially less reliable. The results also show that the valuation coefficients are higher for fair value net assets compared to non-fair value items. In the next section, this study investigates the value relevance of fair values as a function of institutional environment and corporate governance mechanisms.

5.4 The effect of institutional environment and corporate governance

The results in the previous section indicate that the three levels of fair value hierarchy under IFRS 7 are value relevant to investors. The information asymmetry between managers and investors is more likely to be higher for level 3, given the absence of actively traded markets for financial instruments under measurement. Therefore, the second hypothesis tests whether investors place

⁹⁸ Level 2 fair values could be measured based on observable inputs from active markets of similar, rather than identical, financial instruments.

differential valuation weight on fair value levels depending on country-level institutional environment.

The five institutional measures introduced in the previous section are used to investigate the impact of the institutional environment on the value relevance of fair values. Prior studies show that that firms domiciled in countries with strong institutional environment tend to produce higher quality accounting information (see Jaggi and Low, 2000; Ball et al., 2003; Anandarajan et al., 2011; Houqe et al., 2012).

Table 5.5 Panel A provides the correlation coefficients among institutional environment measures. As detailed in Chapter 3, the principle component factor analysis is used to extract a standardised score (*INSSCORE*) summarising the underlying institutional features of each country. In this context, Panel B shows the factor loading after varimax rotation, reflecting the weights used for each institutional measure to generate the standardised score. All institutional measures are positively loaded in calculating *INSSCORE* and the analysis results in a factor with the eigenvalue of 4.4335 accounting for about 89 percent of the total variance in the original variables. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (Kaiser 1974) has a mean of 0.8994 (greater than the critical value of 50), indicating that *INSSCORE* well captures the underlying common factor of the institutional variables (Stewart, 1981). Based on *INSSCORE*, firms are ranked into deciles and the order is reversed and scaled by 9 to form *INSRANK*. *INSRANK* ranges from 0, associated with the highest values of *INSSCORE* (i.e. strong institutional environment), to 1, which reflects the lowest values of *INSSCORE* (i.e. weak institutional environment).

The third hypothesis addresses the impact of corporate governance mechanism on the value relevance of the three levels of fair value. Prior studies indicate that firms with strong corporate governance tend to report higher quality accounting numbers (e.g. Xie et al., 2003; Kent et al., 2010; Song et al., 2010; Bhat, 2013).

Firm-level corporate governance characteristics are summarised by *GOVSCORE* based on the principle component factor analysis of the five governance variables introduced in the preceding section (5.2) and the correlation coefficients among them are shown in Panel A of Table 5.6. As seen in Panel B, all the governance variables are positively loaded to calculate *GOVSCORE* with the exception of the number of blockholders (*No of Block*). As previously discussed, large shareholders may use their control rights to expropriate minority investors.

The generated factor has an eigenvalue of 1.7228, which explains more than 34 percent of the total variations in the governance variables. The Kaiser-Meyer-Olkin measure of sampling adequacy is 0.5274 and above the critical value of 0.50, suggesting that *GOVSCORE* well represents the underlying common factor of the original variables (Kaiser 1974; Stewart 1981).

Table 5. 5 Principal component analysis of institutional environment variables
Panel A Correlations

	<i>Efficacy of corporate boards</i>	<i>Strength of auditing & reporting</i>	<i>Protection of minority interests</i>	<i>Regulation of securities exchanges</i>	<i>Judicial independence</i>
<i>Efficacy of corporate boards</i>	1				
<i>Strength of auditing & reporting</i>	0.9055 (0.000)	1			
<i>Protection of minority interests</i>	0.8649 (0.000)	0.9171 (0.000)	1		
<i>Regulation of securities exchanges</i>	0.8251 (0.000)	0.8451 (0.000)	0.8012 (0.000)	1	
<i>Judicial independence</i>	0.8922 (0.000)	0.85666 (0.000)	0.8545 (0.000)	0.8073 (0.000)	1

Panel B Institutional environment factor score analysis and sample adequacy

Variables	Factor Loading Coefficients	Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy ⁹⁹
<i>Efficacy of corporate boards</i>	0.9538	0.8935
<i>Strength of auditing & reporting</i>	0.9638	0.8559
<i>Protection of minority interests</i>	0.9431	0.8920
<i>Regulation of securities exchanges</i>	0.9073	0.9553
<i>Judicial independence</i>	0.9392	0.9137
<i>Variation Explained</i>	89%	Mean KMO =0.8994
<i>Eigenvalue</i>	4.4335	

Panel C Descriptive statistics of institutional environment score and ranking

Variable	Obs	Mean	Std. Dev.	Min	25th Percentile	Median	75th Percentile	Max
<i>INSSCORE</i>	699	0.00	1.00	-1.94	-.083	0.39	0.68	1.46
<i>INSRANK</i>	699	0.46	0.32	0.00	0.22	0.44	0.78	1.00

Notes: (1) *Efficacy of corporate boards*, (2) *Strength of auditing and reporting standards*, (3) *Protection of minority shareholders' interests*, (4) *Regulation of securities exchanges*, and (5) *Judicial independence* are institutional environment factors extracted from Global Competitiveness Report, reported as a mean for the period 2009-2012. As defined in the notes of Table 5.2, these measures are coded on a scale from 1 to 7, where a value of 1 is associated with weak institutional environment and 7 indicates a strong institutional environment. Panel A shows Pearson correlation coefficients among institutional variables. The numbers in parentheses are p-values. Panel B reports factor loading coefficients as well as Kaiser-Meyer-Olkin index of sampling adequacy for institutional factors using the five institutional environment variables of interest. Panel D presents the descriptive statistics on *INSSCORE* and *INSRANK*. *INSSCORE* is the standardised score calculated using the factor analysis in Panel B. *INSRANK* is the descending decile rank of *INSSCORE* with a range from 0 (strong institutional environment) to 1 (weak institutional environment).

⁹⁹ "The KMO statistic for an individual variable is the sum of the squared correlation coefficients between this variable and all other variables (but not with itself) divided by this value added to the sum of the squared partial correlation coefficients. The KMO statistic for multiple variables is the sum of these statistics computed for all variables in the analysis" (Hutcheson and Sofroniou1999: 224). KMO statistics measures the extent to which the underlying variables belong together and hence suitable for factor analysis. Kaiser (1974) suggests the threshold of KMO = 0.50 under which it is considered that there is little variation shared between variables to be meaningfully explained using principle component factor analysis.

**Table 5. 6 Principal component analysis of corporate governance variables
Panel A Correlations**

	<i>Board Meeting</i>	<i>Audit Size</i>	<i>Audit Meeting</i>	<i>No of Block</i>	<i>Audit Fees</i>
<i>Board Meeting</i>	1				
<i>Audit Size</i>	0.0159 (0.712)	1			
<i>Audit Meeting</i>	0.5888 (0.000)	0.1048 (0.015)	1		
<i>No of Block</i>	-0.107 (0.013)	-0.045 (0.297)	-0.1608 (0.000)	1	
<i>Audit Fees</i>	0.0337 (0.435)	0.2869 (0.000)	0.1535 (0.000)	-0.1092 (0.011)	1

Panel B Corporate governance factor score analysis and sample adequacy

Variables	Factor Loading Coefficients	Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy
<i>Board Meeting</i>	0.7715	0.5075
<i>Audit Size</i>	0.3229	0.5426
<i>Audit Meeting</i>	0.8458	0.5196
<i>No of block</i>	-0.3832	0.7344
<i>Audit Fee</i>	0.4016	0.5421
<i>Variation Explained</i>	0.3446	Mean KMO =0.5274
<i>Eigenvalue</i>	1.7228	

Panel C Descriptive statistics of corporate governance score and ranking

Variable	Obs	Mean	Std. Dev.	Min	25th Percentile	Median	75th Percentile	Max
GOVSCORE	539	0.00	1.00	-1.85	-0.73	-0.28	0.50	3.90
GOVRANK	539	0.50	0.32	0.00	0.22	0.44	0.78	1.00

Notes: The number reported for five firm-level corporate governance variables are the means over the period 2009-2012. The variables include (1) *Board Meeting* is the number of annual board meeting, (2) *Audit Size* is the number of directors serving in the audit committee, (3) *Audit Meeting* is the number of annual audit committee meetings, (4) *No of Block* is the number of shareholders that hold 0.05 or more of voting rights, and (5) *Audi Fees* is the natural logarithm of audit fees as a proxy of audit quality. Panel A report the Pearson correlation coefficients among corporate governance variables. The numbers in parentheses are p-values. Panel B shows the factor loading coefficients as well as the Kaiser-Meyer-Olkin measure of sampling adequacy for the governance score generated based on the five firm-level corporate governance variables. Panel D presents the descriptive statistics on *GOVSCORE* and *GOVRANK*. *GOVSCORE* is the standardised score calculated using the factor analysis and *GOVRANK* is the descending decile rank of the residuals from the regression of *GOVSCORE* on country dummy variables, *COUNTRY*. *GOVRANK* ranges from 0 (strong corporate governance) to 1 (weak corporate governance).

Firm-level corporate governance is highly associated with country-specific characteristics (La Porta et al., 2000; Verriest et al., 2013). As such, the corporate governance, *GOVSCORE*, is regressed on country dummy variables. Based on the residuals from this regression, a decile rank from 0 to 9 is created and then scaled by 9 to form *GOVRANK*. *GOVRANK* ranges from 0, associated with strong corporate governance mechanisms, to 1 for firms with weak corporate

governance mechanisms. Panel D of Table 5.6 presents the descriptive statistics of *GOVSCORE* and *GOVRANK*.

Table 5.7 reports the results of testing the impact of institutional environment and corporate governance, respectively, on the value relevance of fair value hierarchy.

Firstly, Panel A presents the results of the effect of country-level institutional environment on the valuation weight placed on the three levels of fair value. The non-fair value net assets, *NFVNA*, appear to be value relevant ($b_1 = 0.105$). The valuation coefficients on the three levels of fair value hierarchy are statistically significant, indicating that the fair values of financial instruments are value relevant to investors in firms domiciled in countries characterised by strong institutional environment. The coefficient on level 3 fair values, b_4 , is 0.200, slightly lower in magnitude than that on level 1 fair values ($b_2 = 0.209$) and, interestingly, is moderately higher than that on level 2 fair values ($b_3 = 0.175$). Hence, level 3 fair values reported by firms in strong institutional settings are likely to be as value relevant as those classified as level 1 and level 2 fair values. One possible reason for these results could be that managers have private information on the true economic value of financial instruments and in strong institutional information they use it to credibly report level 3 fair value estimates.

The coefficients on the interaction between *INSRANK* and fair values are the incremental valuations for moving from the lowest decile (strong institutional environment) to the highest decile (weak institutional environment) of *INSRANK*. The interaction terms are positive for level 1 and level 2 fair values, however they are not statistically significant. This suggests no significant changes in the value relevance of level 1 and level 2 fair values depending on the strength of institutional environment. The valuation coefficient on the interaction term between institutional environment and level 3 fair values is negative and statistically different from 0, indicating lower value relevance of level 3 fair values for firms in countries with weak institutional environment.

Table 5. 7 The impact of institutional environment and corporate governance on value relevance of fair values

Panel A The Impact of Institutional Environment			Panel A The Impact of Corporate Governance		
VARIABLES	Coeff.		VARIABLES	Coeff.	
<i>NFVNA</i>	b_1	0.105*** (0.0158)	<i>NFVNA</i>	b_1	0.0822** (0.0415)
<i>FVNA1</i>	b_2	0.209*** (0.0431)	<i>FVNA1</i>	b_2	0.184*** (0.0285)
<i>FVNA2</i>	b_3	0.175*** (0.0393)	<i>FVNA2</i>	b_3	0.206*** (0.0401)
<i>FVNA3</i>	b_4	0.200*** (0.0300)	<i>FVNA3</i>	b_4	0.211*** (0.0791)
<i>FVNA1* INSRANK</i>	b_5	0.138 (0.0901)	<i>FVNA1* GOVRANK</i>	b_5	-0.00278 (0.0571)
<i>FVNA2* INSRANK</i>	b_6	0.123 (0.150)	<i>FVNA2* GOVRANK</i>	b_6	0.0226 (0.0386)
<i>FVNA3* INSRANK</i>	b_7	-0.502*** (0.0690)	<i>FVNA3* GOVRANK</i>	b_7	-0.300*** (0.0976)
<i>EPS</i>	b_8	0.762** (0.374)	<i>EPS</i>	b_8	0.625** (0.310)
<i>INSRANK</i>	b_9	-3.910 (2.426)	<i>GOVRANK</i>	b_9	12.39*** (2.266)
Constant	b_0	8.177*** (1.954)	Constant	b_0	1.840 (1.545)
Year dummy D_t		Yes	Year dummy D_t		Yes
Observations		699	Observations		539
No of firms		185	No of firms		140
R-squared		0.741	R-squared		0.432

Notes: Robust standard errors in parentheses. *, **, *** Indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the OLS estimation of the following equation $P_{it} = b_0 + b_1NFVNA_{it} + b_2FVNA1_{it} + b_3FVNA2_{it} + b_4FVNA3_{it} + b_5EPS_{it} + \delta D_t + \varepsilon_{it}$, where P_{it} is the market value per share of firm i three months following the end of fiscal year t . $FVNA1_{it}$, $FVNA2_{it}$ and $FVNA3_{it}$ are fair value of level 1, level 2 and level 3 net assets for firm i as reported at the end of fiscal year t . EPS_{it} is the reported net income of financial firm i for the fiscal year t and D_t is a dummy variable for year t . All accounting information is scaled by the number of outstanding common share. The sample includes financial firms listed in the European Economic Area (EEA) and Switzerland over the period 2009-2012. Column (A) offers the regression results of testing the impact of institutional environment on the value relevance of fair value net assets for the whole sample. *INSRANK* is institutional rank ranging from 0 (weak institutional environment) to 9 (strong institutional environment), which is constructed based on the factor score, *INSSCORE*, using principal-component factor analysis of five institutional variables collected over the period 2009-2012: (1) *Efficacy of corporate boards*, (2) *Strength of auditing and reporting standards*, (3) *Protection of minority shareholders' interests*, (4) *Regulation of securities exchanges*, and (5) *Judicial independence*. The institutional environment variables are defined in the notes of Table 5.2. Column (B) shows the result of evaluating the impact of firm-level corporate governance on the value relevance of the three levels of fair values. Governance rank, *GOVRANK* is constructed based on governance score, *GOVSCORE*, using the principle component analysis of five variables of the period 2009-2012: (1) *Board Meeting*, (2) *Audit Size*, (3) *Audit Meeting*, (4) *No of Block*, and (5) *Audi Fee*. These variables are explained in the notes of Table 5.3. To filter country-specific variations, *GOVSCORE* is regressed on dummy variables for countries and the residuals are used to form a decile governance rank, *GOVRANK*. *GOVRANK* ranges from 0 (weak corporate governance) to 9

(strong corporate governance), and then scaled by 9. The number of observations in this analysis drops to 539 firm-year observations (related to 140 firms) due to missing data on corporate governance.

This confirms the predication of the second hypothesis, *H2B*, that the institutional environment has a greater impact on the value relevance of level 3 fair values than on the value relevance of level 1 or level 2 fair values.

Secondly, Panel B provides the results of testing whether investors place differential weights across the three levels of fair values based on firm-level corporate governance. The coefficient on non-fair value net assets is positive, $b_1 = 0.0822$, and statistically significant at the 0.05 level. The valuation coefficient on level 3 fair values, $b_4 = 0.211$, is slightly higher than those of level 1 and level 2 fair values, $b_2 = 0.184$ and $b_3 = 0.206$, respectively, suggesting that level 3 fair value estimates are at least as value relevant as level 1 and level 2 fair values. It is also noteworthy that the coefficient on level 2 fair values is greater than that on level 1 fair value net assets. That is, for firms with strong corporate governance, there is an increase in the valuation weight that investors place on fair values with the greater use of unobservable inputs for fair value measurement. One possible explanation for this could be that the analysis is conducted during the financial crisis that hit the economies of the countries under study. During the crisis period, market prices become poor indicators of the long-term value of financial assets and liabilities. At the same time, managers have a significant information advantage to report the fundamental values of level 3 fair value estimates. This is particularly true for firms with strong corporate governance mechanisms, which mitigate the information asymmetry problem between managers and shareholders.

The interaction between corporate governance rank and level 1 fair values is positive, while the corresponding interaction with 2 fair values is negative, and both are not statistically significant. This indicates that the market pricing of level 1 and level 2 fair values, which are measured based on observable inputs, is not significantly affected by variation in firms' corporate governance mechanisms. On the other hand, the interaction between corporate governance and level 3 fair

values is negative, as expected, and statistically different from 0 at the 0.01 level. That is, investors appear to place less valuation weight on level 3 fair values for firms with weak corporate governance mechanisms. The findings support the third hypothesis, *H3B*, that the firm-level corporate governance mechanism has a greater impact on the value relevance of level 3 fair values than on the value relevance of level 1 or level 2 fair values. These results are comparable to those reported by Song et al. (2010) that show that the value relevance of level 3 fair values is greater for firms with strong corporate governance mechanisms. Also, they are in line with the study of Bhat (2013) reporting that investors in firms with strong corporate governance mechanisms perceive fair value gains and losses as more relevant and reliable.

Overall, these empirical findings suggest that fair value amounts are value relevant to investors in firms operating in countries characterised by strong institutional environment and in firms with strong corporate governance mechanisms. More importantly, they reveal that the value relevance of level 3 fair values, which is based on managerial expectations and projections, are more affected by the strength of country-level institutional environment and firms' corporate governance mechanisms, in comparison to level 1 and level 2 fair values. In particular, investors appear to place less valuation weight on level 3 fair values, associated with higher information asymmetry, for firms in countries characterised by weak institutional environment as well as for firms with weak governance practices.

5.5 Additional analyses and robustness checks

As pointed out by Song et al. (2011), the differences in the value relevance across firms could reflect differences in firm-specific characteristics, such as asset size, rather than differences in fair value levels. This might be the case if, for example, large firms tend to hold level 1 and level 2 fair values, while small firms rely more on level 3 fair values. Therefore, as a robustness check, this study tests the value relevance of fair value hierarchy for two sub-samples: small and large firms. Another reason for this segmentation is that information asymmetry between managers

and shareholders is likely to be higher for small firms (Atiase, 1985; Freeman, 1987). The small group was defined as firms with average total assets less than the whole sample median and large firms as those with average total assets greater than the sample median, which corresponds to 94 financial firms (349 observations) in the former group and 91 financial firms (350 observations) in the latter.

As shown in Table 5.8 Panel A for small firms, the estimated coefficients on non-fair values as well as level 1 and level 2 fair values are statistically significant, indicating their value relevance. Unlike the entire sample, the valuation coefficient on level 3 fair values is not statistically different from 0. That is, investors in small firms do not perceive fair value estimates based on unobservable inputs as relevant for valuation purposes. One possible reason for this result could be the higher information asymmetry associated with small firms. The valuation coefficients on both level 1 and level 2 fair values are higher than that on level 3 fair values, suggesting that investors in small firms depend more on fair value amounts with observable inputs for valuation purposes. The valuation coefficients on both level 1 and level 2 are significantly higher than non-fair value net assets. Finally, the valuations of non-fair values and level 3 fair values are not statistically different. Moving to Panel B on large firms, both non-fair value and fair value amounts are value relevant to investors. In terms of the differences in the value relevance across fair value levels, large firms show a pattern comparable to that of the entire sample: the valuation coefficient on level 1 fair values is significantly higher than that on level 3 fair values, whereas it is not statistically different from that on level 2 fair values. The valuation of level 2 fair values is higher than that of fair values at level 3, however the difference is not statistically significant. The three levels of fair values are more value relevant than non-fair value amounts.

For additional insight into the results on the value relevance of fair value hierarchy, this thesis also partitions the banks in the main sample into two groups: high versus low Tier 1 capital ratio banks. This partition is based on the findings of prior research indicating that managerial

discretion in banking industry is used to avoid violating regulatory capital requirements (Ramesh and Revsine, 2001; Shrieves and Dahl, 2003; Paananen et al., 2012). Interestingly, Nissim (2003) shows that banks with low Tier 1 ratios tend to overstate, to a large extent, their fair values of loans in order to affect the market perception of their risk and performance. Investors might consider the potential unreliability of fair values in valuing banks with low capital ratios.

Relating to fair value hierarchy, Song et al. (2010) posit that the differences in capital ratio might be correlated with managers' choice of fair value valuation levels. Furthermore, Goh et al. (2015) argue that banks with lower capital adequacy might be forced to liquidate their positions, even though their assets might be sold at fire-sale prices. This is particularly the case in times of financial crisis, which is the study period in this thesis. Investors are more likely to discount the fair value estimates given the greater likelihood of being forced to sell their assets at unfavourable prices, especially those measured based on unobservable inputs (Goh et al., 2015).

This additional analysis is limited to financial firms engaging in traditional banking activities (138 banks in the whole sample) since the regulatory capital requirement are relevant only to banks. Banks are classified as low Tier 1 group (69 banks, and 262 observations) when having Tier 1 ratio below the sample median, and as high Tier 1 banks (69 banks with 263 observations) when their Tier 1 ratio is greater than the sample median.¹⁰⁰

Table 5.9 Panel A shows that results for banks with low Tier 1 ratios. The valuation coefficients on non-fair values in addition to level 1 and level 2 fair values are statistically significant, suggesting their value relevance to investors. The valuation coefficient on level 3 fair values is not statistically significant. That is, investors consider level 3 fair values reported by banks with low Tier 1 ratios as not sufficiently reliable to be reflected in firm value. The valuations of level 1 and level 2 fair values are significantly higher than that of fair values at level 3. This might be explained by reliability concerns about fair value estimates for banks close to the minimum

¹⁰⁰ The average Tier 1 ratio of each bank over the period 2009-2012 is used to calculate the sample median.

regulatory capital ratio (Nissim, 2003; Paananen et al., 2012). Moreover, the valuations of the three levels of fair value are significantly different from those of non-fair value amounts. Turning to the results for banks with high Tier 1 ratios in Panel B of Table 5.9, the estimated coefficients on both non-fair value and fair value amounts are significantly different from 0, indicating their value relevance to investors. Interestingly, the valuations across the three levels of fair value are not statistically different. This suggests that investors in banks with high capital ratios perceive fair values based on unobservable inputs as value relevant as those measured using observable inputs. One explanation could be the lower incentive for managers to use accounting discretion for the purpose of capital management (Ahmed et al., 1999; Nissim, 2003; Vyas, 2011).¹⁰¹ Finally, with the exception of level 2 fair values, the valuation coefficients on fair value amounts are significantly greater than that on non-fair values.

¹⁰¹ However, some have argued that the impact of fair value adjustments alone on determining banks' regulatory capital ratio is limited (e.g. Barth and Landsman, 2010; Laux, and Leuz, 2009).

Table 5. 8 Value relevance of fair values hierarchy for large versus small firms

Panel A Small Firms					Panel B Large Firms						
VARIABLES	Coeff.		Test	F-stat	p-value	VARIABLES	Coeff.		Test	F-stat	p-value
<i>NFVNA</i>	b_1	0.181*** (0.0428)	$FVNA1 = FVNA3$	4.69	0.0311**	<i>NFVNA</i>	b_1	0.105*** (0.0263)	$FVNA1 = FVNA3$	8.37	0.0041***
<i>FVNA1</i>	b_2	0.361*** (0.0661)	$FVNA1 = FVNA2$	0.16	0.6931	<i>FVNA1</i>	b_2	0.296*** (0.0424)	$FVNA1 = FVNA2$	2.28	0.1323
<i>FVNA2</i>	b_3	0.315*** (0.0667)	$FVNA2 = FVNA3$	4.48	0.0349**	<i>FVNA2</i>	b_3	0.228*** (0.0519)	$FVNA2 = FVNA3$	0.99	0.3207
<i>FVNA3</i>	b_4	-0.199 (0.237)	$FVNA1 = NFVNA$	4.03	0.0454**	<i>FVNA3</i>	b_4	0.164*** (0.0477)	$FVNA1 = NFVNA$	34.21	0.0001***
<i>EPS</i>	b_5	-0.484 (0.822)	$FVNA2 = NFVNA$	4.29	0.0391***	<i>EPS</i>	b_5	2.640*** (0.965)	$FVNA2 = NFVNA$	6.74	0.0098***
Constant	b_0	6.329*** (1.674)	$FVNA3 = NFVNA$	2.53	0.1129	Constant	b_0	4.029 (2.664)	$FVNA3 = NFVNA$	4.94	0.0270**
Year dummy D_t		Yes				Year dummy D_t		Yes			
Observations		349				Observations		350			
No of firms		94				No of firms		91			
R-squared		0.769				R-squared		0.656			

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the OLS estimation of the following equation $P_{it} = b_0 + b_1NFVNA_{it} + b_2FVNA1_{it} + b_3FVNA2_{it} + b_4FVNA3_{it} + b_5EPS_{it} + \delta D_t + \varepsilon_{it}$, where P_{it} is the market value per share of firm i three months following the end of fiscal year t . $FVNA1_{it}$, $FVNA2_{it}$ and $FVNA3_{it}$ are fair value of level 1, level 2 and level 3 net assets for firm i as reported at the end of fiscal year t . EPS_{it} is the reported net income of financial firm i for the fiscal year t and D_t is a dummy variable for year t . All accounting information is scaled by the number of outstanding common share. This table shows the regression results of partitioning the sample by total assets of firms. Financial firms are classified into small or large firms based on the median value of total asset for the entire sample. The sum of observations in the two sub-samples (349 + 350 = 699) equals the total number of observations shown in Table 5.4.

Table 5. 9 Value relevance of fair values hierarchy for low versus high tier 1 banks

Panel A Banks with low Tier 1 Ratio					Panel B Banks with High Tier 1 Ratio						
VARIABLES	Coeff.		Test	F-stat	p-value	VARIABLES	Coeff.		Test	F-stat	p-value
<i>NFVNA</i>	b_1	0.0829*** (0.0126)	$FVNA1 = FVNA3$	32.03	0.0001***	<i>NFVNA</i>	b_1	0.204*** (0.0297)	$FVNA1 = FVNA3$	0.31	0.5784
<i>FVNA1</i>	b_2	0.328*** (0.0496)	$FVNA1 = FVNA2$	0.41	0.5215	<i>FVNA1</i>	b_2	0.342*** (0.0347)	$FVNA1 = FVNA2$	1.44	0.2317
<i>FVNA2</i>	b_3	0.367*** (0.0652)	$FVNA2 = FVNA3$	30.47	0.0001***	<i>FVNA2</i>	b_3	0.260*** (0.0529)	$FVNA2 = FVNA3$	3.44	0.0649*
<i>FVNA3</i>	b_4	-0.0436 (0.0327)	$FVNA1 = NFVNA$	36.20	0.0001***	<i>FVNA3</i>	b_4	0.376*** (0.0512)	$FVNA1 = NFVNA$	9.71	0.0020***
<i>EPS</i>	b_5	1.082** (0.484)	$FVNA2 = NFVNA$	32.98	0.0001***	<i>EPS</i>	b_5	2.561*** (0.889)	$FVNA2 = NFVNA$	1.53	0.2172
Constant	b_0	2.612 (1.819)	$FVNA3 = NFVNA$	15.93	0.0001***	Constant	b_0	6.133* (3.326)	$FVNA3 = NFVNA$	32.34	0.0001***
Year dummy D_t		Yes				Year dummy D_t		Yes			
Observations		263				Observations		262			
No of firms		69				No of firms		69			
R-squared		0.768				R-squared		0.764			

Notice: Robust standard errors in parentheses. *, **, *** Indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the OLS estimation of the following equation $P_{it} = b_0 + b_1NFVNA_{it} + b_2FVNA1_{it} + b_3FVNA2_{it} + b_4FVNA3_{it} + b_5EPS_{it} + \delta D_t + \varepsilon_{it}$. where P_{it} is the market value per share of firm i three months following the end of fiscal year t . $FVNA1_{it}$, $FVNA2_{it}$ and $FVNA3_{it}$ are fair value of level 1, level 2 and level 3 net assets for firm i as reported at the end of fiscal year t . EPS_{it} is the reported net income of financial firm i for the fiscal year t and D_t is a dummy variable for year t . All accounting information is scaled by the number of outstanding common share. This table provides the regression results of partitioning the banks in the sample by Tier 1 ratio. Banks are classified to either low or high Tier 1 ratio based on the median value of Tier 1 ratio for the entire sample. The sum of observations in the two sub-samples (263 + 262 = 525) is lower than the total number of observations (699) shown in Table 5.4, because the analysis in this table is restricted to financial firms whose primary business is to engage in traditional banking activities and have data on Tier 1 ratio in BankScope.

As a sensitivity test, this study re-estimates the main model to test the value relevance of fair hierarchy and scales all the variables using lagged total assets in lieu of the number of shares outstanding. A number of accounting studies use lagged total assets to mitigate the potential scale related-effect of the price model (see, for example, Marquardt and Wiedman, 2004; O'Hanlon and Taylor, 2007; Manganaris et al., 2015). As shown in Table 5.10, both non-fair value and fair value amounts are value relevant to investors since their estimated coefficients are significantly different from 0. Furthermore, the valuation coefficients on *FVNA1* and *FVNA2* are statistically different from that *FVNA3* (F-statistics: 4.58, F-statistics: 4.80, respectively). In other words, the empirical analysis after scaling all the variables by the total assets indicates that the value relevance of level 3 fair values, based on managerial projections and other unobservable inputs, is significantly lower than that on level 1 and level 2 fair values, measured using observable inputs. The valuation of level 1 fair values is not different from that of level 3 fair value net assets. Unlike the main model results, the valuation coefficients on fair value amounts appear to not significantly differ from that on non-fair values. Overall, Table 5.10 shows that the main results hold to a large extent after scaling the variables by lagged total assets in the model employed. Finally, the present study runs the regression to test whether investors place differential weights across the three levels of fair value using the market value of equity six months after the end of the fiscal year. Some prior studies use stock prices six months after fiscal year-end as the dependent variable in the price model (e.g. Liu et al., 2011; Barth et al., 2012). Table 5.11, the main findings of the empirical analysis are not substantially altered after employing the market value six months, rather than three month, following the end of fiscal year.

Table 5. 10 Value relevance of fair values hierarchy using alternative scaling method

VARIABLES	Coeff.	Panel A		Panel B	
			Test	F-stat	p-value
<i>NFVNA</i>	b_1	0.807*** (0.152)	$FVNA1 = FVNA3$	4.58	0.0326**
<i>FVNA1</i>	b_2	0.986*** (0.158)	$FVNA1 = FVNA2$	0.78	0.3788
<i>FVNA2</i>	b_3	0.856*** (0.162)	$FVNA2 = FVNA3$	4.80	0.0288**
<i>FVNA3</i>	b_4	0.475** (0.206)	$FVNA1 = NFVNA$	2.61	0.1069
<i>EPS</i>	b_5	3.846*** (1.453)	$FVNA2 = NFVNA$	0.49	0.4849
Constant	b_0	-1.448 (52.76)	$FVNA3 = NFVNA$	3.60	0.0582*
Year Dummy		Yes			
Observations		699			
No of firms		185			
R-squared		0.713			

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the OLS estimation of the following equation $P_{it} = b_0 + b_1NFVNA_{it} + b_2FVNA1_{it} + b_3FVNA2_{it} + b_4FVNA3_{it} + b_5EPS_{it} + \delta D_t + \varepsilon_{it}$, where P_{it} is the market value of firm i three months following the end of fiscal year t . $FVNA1_{it}$, $FVNA2_{it}$ and $FVNA3_{it}$ are fair value of level 1, level 2 and level 3 net assets for firm i as reported at the end of fiscal year t . EPS_{it} is the reported net income of financial firm i for the fiscal year t and D_t is a dummy variable for year t . In this form of the model all the market and accounting variables are scaled by lagged total assets (i.e. total assets for firm i as reported at the end of fiscal year $t-1$). While Panel A shows the results of the regression, Panel B offers F-statistics testing the differences between the estimation coefficients.

In particular, both non-fair values and the three levels of fair values are value relevant to investors. The valuation coefficient on level 1 fair values is significantly greater than that on level 3 fair values. Again, this indicates that investors place less valuation weight on level 3 fair values, which is subject to potential managerial manipulation and measurement error in comparison to level 1 fair values measured based on observable inputs from active markets of identical assets or liabilities. The valuation coefficient on level 2 fair value is greater than that on level 3 fair values, yet the difference is not statistically significant. The valuation coefficient on each of three fair value levels is higher in magnitude than that on non-fair value net assets, suggesting that they are more value relevant than non-fair value amounts.

In sum, the results are largely unaffected when the estimation of the value relevance of fair value hierarchy employs the market value of equity six months after the end of the fiscal year as a dependent variable.

Table 5. 11 Value relevance of fair values hierarchy using six months market value

VARIABLES	Coeff.	Panel A		Panel B	
			Test	F-stat	p-value
<i>NFVNA</i>	b_1	0.0584*** (0.0115)	$FVNA1 = FVNA3$	19.18	0.0001***
<i>FVNA1</i>	b_2	0.190*** (0.0173)	$FVNA1 = FVNA2$	3.91	0.0484**
<i>FVNA2</i>	b_3	0.144*** (0.0249)	$FVNA2 = FVNA3$	2.22	0.1365
<i>FVNA3</i>	b_4	0.0979*** (0.0220)	$FVNA1 = NFVNA$	77.33	0.0001***
<i>EPS</i>	b_5	1.694** (0.708)	$FVNA2 = NFVNA$	14.13	0.0002***
Constant	b_0	5.778*** (1.246)	$FVNA3 = NFVNA$	8.07	0.0046***
Year Dummy		Yes			
Observations		699			
No of firms		185			
R-squared		0.574			

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. . The table reports the OLS estimation of the following equation $P_{it} = b_0 + b_1NFVNA_{it} + b_2FVNA1_{it} + b_3FVNA2_{it} + b_4FVNA3_{it} + b_5EPS_{it} + \delta D_t + \varepsilon_{it}$, where P_{it} is the market value per share of firm i six months following the end of fiscal year t . $FVNA1_{it}$, $FVNA2_{it}$ and $FVNA3_{it}$ are fair value of level 1, level 2 and level 3 net assets for firm i as reported at the end of fiscal year t . EPS_{it} is the reported net income of financial firm i for the fiscal year t and D_t is a dummy variable for year t . All accounting information is scaled by the number of outstanding common share. The sample includes 699 firm-year of 185 distinct firms in the European Economic Area (EEA) and Switzerland over the period 2009-2012. While Panel A shows the results of the regression, Panel B offers F-statistics testing the differences between the estimation coefficients.

5.6 Conclusion

The second empirical part of this thesis examines the value relevance of the three levels of fair values as disclosed under IFRS 7. In particular, it examines whether there are variations in the valuation weight placed by investors on fair value net assets across the three levels of fair value hierarchy. In a further analysis, it investigates whether the value relevance of the three levels of fair value hierarchy depends on the country-level institutional environment and firm-level corporate governance mechanisms.

The results of this study suggest that investors place a higher valuation weight on mark-to-market fair values net assets, based on observable inputs, relative to mark-to-model fair values, estimated based on unobservable inputs. In particular, the valuation coefficient on level 3 fair value is lower in magnitude than that on level 1 and level 2 fair values; yet the difference is statistically significant only for level 1. Overall, these results are comparable to the empirical findings of prior accounting studies focusing on US markets (Kolev, 2009; Song et al., 2010; Goh et al., 2015).

Furthermore, the value relevance of fair value hierarchy is examined as a function of the institutional environment and corporate governance. The results reveal that the value relevance of level 3 fair values tend to be lower for firms domiciled in countries characterised by weak institutional environment and for firms with weak corporate governance mechanisms. The impact of the institutional environment and corporate governance on the value relevance of level 1 and level 2 fair values appear to be statistically insignificant. These findings provide support to the view that both the institutional environment and corporate governance play a significant role in mitigating information asymmetry problem associated with fair value amounts estimated based on managerial projections and private information.

As a further analysis, the entire sample is split using the sample median of total assets into two groups: small and large firms. The results for small firms show that level 3 fair values are not value relevant to investors, and the valuations of both level 1 and level 2 fair value net assets are significantly higher than that on level 3 fair values. For the group of large firms, the results of the whole sample tend to be confirmed; the valuations on level 1 and level 2 fair value net assets are greater than that on level 3 fair values, the difference is significant only for level 1.

Additionally, using the sample mean of capital Tier 1 ratio, the banks in the sample are classified into: low Tier 1 versus high Tier 1 ratio banks. The results for banks with lower Tier 1 ratios show that the valuation coefficient on level 3 fair values is not statistically significant and significantly lower than those on level 1 and level 2 fair values. Interestingly, the valuations on

the three levels of fair values hierarchy are not significantly different in magnitude for the subsample of banks with high Tier 1 ratios.

Finally, the main results are largely robust to alternative scaling method and to use market value of equity six months after the end of fiscal year as a dependent variable.

Chapter 6: Conclusion

6.1 Introduction

This thesis aims at investigating the value relevance of IFRS and the effect of the financial crisis on European financial firms. The empirical work is divided into two main parts. The first part aims to investigate the impact of IFRS adoption and of the financial crisis on the value relevance of accounting information of financial firms. The second part seeks to examine the value relevance of fair value hierarchy as disclosed under IFRS 7 by financial firms.

This chapter proceeds as follows: Section 6.2 provides concluding remarks on the impact of IFRS adoption and the financial crisis on value relevance, after which Section 6.3 provides concluding remarks on the value relevance of fair value hierarchy. Section 6.4 presents implications of the findings obtained in this thesis. Finally, Section 6.5 discusses the study limitations and offers some directions for future research.

6.2 Conclusion on the impact of IFRS and the crisis on value relevance

Since 2005, listed firms in the European Economic Area (EEA) and Switzerland¹⁰² are required to prepare their financial statements under IFRS in lieu of local accounting standards. The impact of mandatory IFRS adoption on accounting information quality in general has been extensively investigated in prior research; however, little attention has been given to the financial sector. Besides, the specific characteristics of financial firms, such as holding a considerable percentage of their assets and liabilities measured at fair value, make them ideally suited to examine the impact of the financial crisis on the valuation roles of the balance sheet and the income statement.

¹⁰² In Switzerland, listed firms are required to prepare their financial statements using either IFRS or the US GAAP since 2005.

Based on a sample of financial firms listed on the EEA and Switzerland stock markets over the period 1999-2012, the first empirical part examines four research questions related to IFRS adoption and the financial crisis.

The first research question examines whether the value relevance of accounting information increases following mandatory IFRS adoption by financial firms. The findings show that the combined value relevance of book value of equity and earnings, measured by the explanatory power of the price model, has increased following IFRS adoption for both the entire sample of financial firms and the sub-sample of banks. Specifically, the explanatory power of the price model is significantly higher during the IFRS adoption period (2005-2012) relative to the pre-IFRS adoption period (1999-2004). This suggests that mandatory IFRS adoption results in an increase in accounting information quality of financial firms.

The second research question addresses whether the value relevance of equity book value increases, while the value relevance of net income decreases for financial firms as the financial crisis evolves. The study finds that the valuation coefficient on the interaction between the crisis and the book value of equity is positive in the price model, while the coefficient on the corresponding interaction with earnings is negative. This indicates that when the financial crisis hit in 2008 investors in financial firms placed more valuation weight on book value of equity, the primary summary measure of the balance sheet, and less weight on net income, the summary measure of the income statement. This in turn supports the view that the balance sheet and the income statement fulfil distinctive valuation roles.

The third research question asks if during the crisis the value relevance of equity book value increases and that of net income decreases in countries characterised by a weak institutional environment. Country-level institutional factors are found to have significant impact on the value relevance of book value of equity, but not on that of earnings. In particular, book value of equity

tends to be more value relevant in countries with weak institutional environment during the financial crisis.

Finally, the fourth research question in the first part is whether the value relevance of equity book value increases and that of net income decreases for firms with weak corporate governance. The results suggest that firm-level corporate governance mechanisms have a significant impact on the value relevance of equity book value, but not on earnings. Firms with weak corporate governance mechanisms appear to have more value relevant book value of equity. Overall, the findings provide partial support for the hypotheses that during the crisis period the value relevance of book value of equity and earnings is related to the country-level institutional environment and firm-level corporate governance mechanisms. All the results reported are consistent for both the entire sample of financial firms and the sub-sample of banks.

As a further analysis to examine the impact of IFRS adoption on the value relevance of accounting information, the sample is partitioned, according to total assets, into two sub-samples: small and large financial firms. The results for the group of small financial firms suggest that there is an increase in the combined value relevance of book value of equity and earnings after IFRS adoption; yet the change is not statistically significant. For large financial firms, the results show a significant increase in the overall value relevance of equity book value and earnings. In sum, the findings suggest that the impact of mandatory IFRS adoption is much more pronounced for large financial firms compared to small financial firms. Also the sub-sample of banks is split into high versus low Tier 1 ratio banks. Banks might use managerial discretion over financial reporting in order to avoid violating regulatory capital requirements (Ahmed et al., 1999; Wilson et al., 2010). For both low and high Tier 1 ratio banks, the overall value relevance of book value of equity and earnings significantly increases following the mandatory adoption of IFRS in 2005. Similarly, the impact of the financial crisis on the valuation roles of the balance sheet and the income statement is examined for subsamples partitioned by financial firm size, as well as bank

Tier 1 capital ratio. The findings suggest that the interaction between the crisis and book value of equity (earnings) is positive (negative) for both small and large financial firms; however, it is statistically significant only for the former. Similarly, the increase (decrease) in the value relevance of book value of equity (earnings) as the crisis evolved is statistically significant only for banks with low Tier 1 ratio. This suggests that the effect of the financial crisis on the valuation roles of the balance sheet and income statement is more pronounced for smaller financial firms in comparison to large financial firms, as well as for banks with low capital ratio in comparison to those with high capital ratio.

Finally, the main results are largely robust to alternative scaling method and to use market value of equity six months after the end of fiscal year as a dependent variable. Also, the main findings tend to be confirmed when using the return model in examining the impact of IFRS adoption, as well as after including the voluntary IFRS adopters in evaluating the effect of the financial crisis.

6.3 Conclusion on value relevance of fair value hierarchy

Under IFRS 7, firms are required to disclose the fair value of financial instruments by levels, where these levels reflect the valuation inputs to estimate fair values. In this fair value hierarchy, a financial instrument is classified as level 1 when the fair value is measured using quoted prices for identical instruments traded in active market; level 2 when fair values is measured based on observable market inputs other than those used in level 1 (e.g. quoted price for comparable financial instruments); or level 3 when the valuation inputs are not observable (i.e. using managerial projections and assumptions).

The second empirical part uses data from listed firms in the EEA and Switzerland over 2009-2012 to answer three research questions related to fair value hierarchy disclosure under IFRS 7.

The first research question examines whether the value relevance of level 1 and level 2 fair values is higher than the value relevance of level 3 fair values. The findings show that all fair value levels are value relevant to investors. The valuation coefficient on level 3 fair value net assets is

lower in magnitude than those on level 1 and level 2 fair values (the difference is statistically significant only for level 1 fair values). These findings indicate that investors tend to place less valuation weight on less reliable fair value information at level 3 that is associated with greater information asymmetry due to inherent measurement error and potential managerial manipulation (or optimism).

The second research addressed is whether the institutional environment has a greater impact on the value relevance of level 3 fair values than on the value relevance of level 1 or level 2 fair values. The study finds that for firms domiciled in countries characterised by strong institutional environment, the valuation coefficients on the three levels of fair value hierarchy are statistically significant, suggesting they provide value relevant information to investors. Moreover, the valuation of level 3 fair value is slightly lower (higher) than that on level 1 (level 2) fair values. This indicates that fair value estimates that are based on unobservable inputs and reported by firms in strong institutional settings are likely to be as value relevant as those measured using observable inputs. The coefficient on the interaction between institutional environment and fair values is significant (and negative) for those at level 3 only. Hence, the institutional environment characteristics have a significant impact on the value relevance of level 3 fair value net assets, but not on that of fair values at level 1 and level 2.

The final research question in the second part asks if corporate governance mechanisms have a greater impact on the value relevance of level 3 fair values than on the value relevance of level 1 or level 2 fair values. The findings show that the three levels of fair value are value relevant to investors in firms with strong corporate governance mechanisms. Interestingly, the valuation coefficient on level 3 fair values is slightly higher than the coefficients of level 1 and level 2 fair values, suggesting that fair values estimated using internally generated inputs are at least as value relevant as those measured based on observable inputs. The interaction between corporate governance mechanisms and fair values is statistically significant (and negative) for those marked

as level 3 fair values only, indicating that firm-level governance mechanisms have a significant influence on the value relevance of fair values categorised as level 3 only.

As an additional analysis, the sample of financial firms is divided into small and large firms based on total assets. The findings for the sub-sample of small firms reveal that the valuation coefficient on level 3 fair value is not statistically significant. This suggests that the fair value estimates based on unobservable inputs reported by small financial firms are not value relevant. The valuation coefficients on both level 1 and level 2 are statistically higher than that on fair values classified at level 3. The results for the large financial firms are in line with those reported for the entire sample. The valuation coefficient on level 1 fair value is greater than that on fair values at level 2 and level 3 (the difference is significant only for level 3 net assets). The valuation of level 2 fair values is greater than that of level 3 fair value, however the difference is not statistically significant.

A further analysis is carried out by partitioning the banks in the sample into low and high Tier 1 ratio banks. The sub-sample of banks with low Tier 1 ratios shows that the valuation coefficient on level 3 fair values is not statistically significant. These results indicate that fair value estimates measured using unobservable inputs which are reported by banks with low Tier 1 ratios are not value relevant. The valuation of level 1 and level 2 fair values are higher than the valuation of fair values at level 3. For banks with high Tier 1 ratio the valuation coefficients across the three fair value levels are significant and not statistically different in magnitude.

Finally, the main results are generally robust to the use of lagged book value of equity as alternative scaling method and to the use of market value of equity six months after the end of fiscal year as a dependent variable in the price model.

6.4 Implications

Standard-setters can use the empirical findings from value relevance research to provide feedback on whether a change in accounting standards has improved the quality of financial statement

information. This thesis provides insights relevant to standard-setters, especially IASB, by evaluating the effect of IFRS adoption on the quality of accounting information presented by firms from a specific sector, and herein financial firms. The thesis provides empirical evidence which suggests that the value relevance of financial statements has increased following the mandatory adoption of IFRS in 2005 by financial firms with their own specific characteristics (e.g. holding a substantial proportion of financial instruments in their financial statements, in addition to being heavily regulated). This complements the empirical evidence from previous studies showing an improvement in the value relevance of accounting information based on samples from a wide spectrum of industries. The study also provides some findings on the impact of IFRS adoption on the value relevance of accounting information over relatively longer periods of time compared to previous empirical evidence, i.e. from the early years of adoption. In addition, the results obtained in this study concerning the changes in the value relevance of accounting information after IFRS adoption are relevant to accounting jurisdictions that consider IFRS adoption as well as to accounting standard setters considering the convergence of their standards with IFRS (such as FASB).

Understanding the effects of economic crises on the value relevance of accounting numbers is of potential interest to accounting regulators and security commissions, when preparing and adopting accounting standards that seek to reduce information asymmetry between managers and shareholders, improve the quality of financial statement information and enhance the disclosure in light of the crisis. Also, the results of the thesis might be useful for policy makers (i.e. bank regulators) when adopting defence mechanisms against financial and sovereign debt crises. For example, reported accounting figures are used to calculate the capital adequacy ratios and thus they might be used by managers for capital management purposes. It is essential therefore for bank regulators to have an insight into how market participants perceive this information when market conditions deteriorate. The results suggest that the value relevance of book value of equity

increases, while that of earnings decreases as the crisis strikes. More importantly, the focus of this thesis is on financial firms which have been at the heart of the financial crisis. This might provide some insight on the impact of fair value accounting on the valuation characteristics of the two main financial statements, the balance sheet and the income statement, in times of financial crisis.

The empirical findings from testing the value relevance of fair value should be of particular interest to standard setters who can assess whether fair value hierarchy disclosure provides useful information to investors for valuation purposes. When IASB issued amendments to IFRS 7 in 2009, it had the objective of improving information disclosure to help information users in evaluating the significance of financial instruments for the firms' financial position and performance. The results of this study indicate that investors attach different valuation weights to fair value amounts based on the valuation inputs information provided by firms, confirming the potential valuation benefits from the new disclosure requirements. In addition, these findings are of potential interest to financial statement preparers, i.e., financial firms' managers, as well as financial analysts. They give an indication on how market participants perceive fair value accounting information and how the valuation of this information varies with inputs to fair value measurements.

The results should also be of interest to accounting scholars, especially those who focus on fair value accounting. The findings show that the characteristics of the institutional environment, in addition to firm-level corporate governance mechanisms, play a role in determining the valuation roles of the balance sheet and the income statement of financial institutions whose financial statements are more exposed to fair value accounting in comparison to other industries.

Furthermore, they appear to have an important role in mitigating reliability concerns relating to financial assets and liabilities for which active markets do not exist. As such, firm-level corporate governance mechanisms as well as the country-specific characteristics with regard to the legal and investment environment should be taken into consideration when examining fair value accounting in multi-country contexts.

6.5 Research limitations and avenues for future research

As with all research, this thesis is unquestionably subject to several limitations. The study is limited to the firms domiciled in European countries. This may limit the generalisability of the findings to non-European countries. Whether similar findings are obtained in a non-European context, with different institutional, political, and cultural environments is a matter for future research.

This study covers eight years of IFRS adoption, which is a longer period of time compared to that covered by several previous studies, which address the early years of IFRS adoption (e.g. Agostino et al., 2011). Still, the time frame is relatively short. Therefore, it would be interesting to revisit the effect of IFRS implementation on the overall value relevance of book value of equity and net income reported by financial firms over the long run. Also, the findings concerning the differences in the value relevance across the three levels of fair value hierarchy may vary after 2012 because of the adoption of IFRS 13. IFRS 13 *Fair Value Measurement* is mandatory for fiscal years beginning on or after 1 January 2013 (i.e. following the end of the study period). IFRS 13 provides more detailed guidance on fair value disclosure, especially for level 3 fair values, which might have an influence on the value relevance of fair values.

Five corporate governance measures are used to proxy for corporate governance mechanisms at firm level. Although these governance measures are collected over the five years of the study

period,¹⁰³ rather than only from one year as in several prior studies (e.g. Davis-Friday et al., 2006; Vyas, 2011), they capture only five dimensions of corporate governance. The accounting literature introduces more measures of corporate governance that can affect the quality of accounting information (Garcia Lara et al., 2007; Larcker et al., 2007; Verriest et al., 2013). Future research could extend the analysis by using a broader set of corporate governance indicators.

Another area of concern is related to the efficiency issues of the capital markets in some of the countries under investigation. This is particularly true for emerging markets in Eastern and Central Europe in comparison to those in Western Europe. Some authors have raised concerns about the interpretation of the results obtained by the value relevance studies conducted in possibly inefficient capital markets (e.g. Holthausen and Watts, 2001; Aboody et al., 2002). On the other hand, Barth et al. (2001) point out that market value of equity in value relevance models reflects the investors' consensus about the underlying economic value of equity, which is not necessarily equal to the underlying economic value itself. In such settings, the assumption of market efficiency becomes unnecessary. The present study, therefore, does not derive theoretical benchmarks for the valuation coefficients on accounting numbers, and neither does it test their deviations from any theoretical values. Future research may address the impact of market efficiency on the value relevance of accounting variables employed in this study, for example the three levels of fair value.

In evaluating the impact of the financial crisis on the valuation roles of the balance sheet and income statement, this thesis uses the two statements' summary measures, equity book value and net income, respectively. The valuation coefficients on the components of the book value of equity and net income might differ (see, for example, the different valuation coefficients on non-fair value net assets and the three levels of fair value obtained in this thesis). Additional research

¹⁰³ Corporate governance data are collected for four years when investigating the value relevance of fair value hierarchy.

could be carried out to evaluate the impact of the financial crisis on the components of the balance sheet and income statement.

Finally, future studies can investigate whether the effects of IFRS adoption and of the financial crisis on the value relevance of accounting information vary across other industries, compared to financial institutions.

Appendix I

Literature review on the impact of IFRS and the crisis on value relevance

-Value relevance of IFRS

-Single country studies

Author (s)	Research objective	Sample	Methodology	Primary findings
Gjerde et al. (2008)	To evaluate whether IFRS adoption results in higher value relevance accounting information	A sample of 145 firms listed on Oslo stock Exchange in 2005.	The price and return models	The analysis reveals little evidence of increased value-relevance after the mandatory adoption of IFRS in 2005.
Morais and Curto (2008)	To evaluate whether IFRS adoption results in higher value relevance accounting information	A sample of 34 Portuguese listed over the period from 1994 to 2006	The price model	They find a decrease in the value relevance of accounting information over the two years of IFRS (2005-2006) compared to the period of domestic GAAP (1995-2004)
Paananen (2008)	To evaluate whether IFRS adoption results in higher value relevance accounting information	A sample of 376 firms over the period 2003-2006 in Sweden.	The price model	The findings suggest a decrease in the value relevance of accounting information, but the difference is not statistically significant.
Filip (2010)	To evaluate whether mandatory IFRS adoption in 2001 results in higher value relevance accounting information	A sample of 280 firm-year observations (related to 48 firms) over the period 1997-2004 in Romania	The return model	The value relevance of accounting information is significantly higher in the period of IFRS adoption (2001-2004) compared to pre-IFRS adoption period.
Dobija and Klimczak (2010)	To evaluate whether the introduction of new Polish accounting in 2000 and IFRS in 2005 result in higher value relevance accounting information	A sample of 856 Polish firm-year observations over the period 1997-2008 in Poland.	The return model	There is no improvement in the value relevance of accounting information following the two periods of interest (the new Polish accounting standards and IFRS adoption).
Oliveira et al. (2010)	To examine whether the value relevance of book value of equity, earnings and recognised intangible assets increase after the mandatory adoption of IFRS.	A sample of 354 Portuguese non-financial listed firms over the period 1998-2008.	The price model	They report a decrease in the value relevance of earnings compared to no effect on that of equity book value following the implementation of IFRS in 2005.
Chalmers et al. (2011)	To evaluate whether IFRS adoption results in higher value relevance accounting information	A sample of 20,025 Australian firm-year observations over the period 1990-2008.	The price model	They find a little evidence of increase in the value relevance of accounting information after the mandatory IFRS adoption in 2005
Liu et al. (2011)	To examine whether IFRS adoption results in higher value relevance accounting information.	A sample of 870 firms over the period 2005-2008 in China.	The price and return models	Their findings indicate an increase in the value relevance of accounting information following IFRS mandatory adoption. Also, there is an increase in the value relevance of reported earnings but not in

				that of book value of equity.
Karampinis and Hevas (2011),	To examine whether there has been an improvement in the value relevance of accounting information and conditional conservatism after IFRS adoption	A sample of 869 Greek firm-year observations over the period 2002-2007.	The price and return models. To proxy for conditional conservatism, income is regressed on returns interacted the sign of returns.	The study report that there is not significant improvement in the quality of accounting information (value relevance and conditional conservatism) following IFRS adoption in Greece.
Tsalavoutas et al. (2012)	To evaluate whether there has been an improvement in the value relevance of accounting information after IFRS adoption.	A sample of 1,861 Greek firm-year observations over the period 2001-2008.	The price and return models	They report no significant change in the value relevance of financial reporting after the mandatory introduction of IFRS. Furthermore, the results show a significant increase (decrease) in the coefficient of equity book value (net income)

- Multi-country studies

Author (s)	Research objective	Sample	Methodology	Primary findings
Morais and Curto (2009)	To examine whether there has been any improvement in the value relevance of accounting information following the mandatory introduction of IFRS	A sample of 6,977 European listed companies from 14 different countries in the EEA over 2001-2005.	The price model	The results suggest that the value relevance of financial statements over the first year of mandatory IFRS adoption is higher in comparison to those reported in the period of domestic accounting standards.
Devalle et al. (2010)	To investigate whether there has been any improvement in the value relevance of accounting information after mandatory IFRS adoption.	A sample of 3,721 companies listed on five European stock exchanges from 2002 to 2007.	The price and return models	They report that there has been an increase in the value relevance after IFRS adoption. Also, the value relevance of net income has increased in comparison to a decrease in value relevance of book value of equity.
Aubert and Grudnitski (2011)	To examine whether there has been any improvement in the value relevance of accounting information after mandatory IFRS adoption.	a sample of 3,530 firms in 14 EEA countries and Switzerland in 2005	A regression of stock return on reported net income	The results show a positive association between earnings and stock return for the entire sample. Country by country provides inconclusive findings
Clarkson et al. (2011)	To evaluate whether IFRS adoption results in higher value relevance accounting information.	A sample of 3,488 firms in 15 EU countries in 2005	The price model	The results report no improvements in the value relevance for both sub-samples of code law and common law countries. County-by-country analysis shows mixed results

- IFRS adoption and financial firms

Gebhardt and Novotny-Farkas (2011)	To investigate whether there is any change in the use of loan loss provisions (LLPs) as a tool for earnings management and capital management after IFRS adoption.	A sample of 90 banks listed in 12 European countries over the period from 2000 to 2007.	Loan loss provisions (LLPs) are regressed on the determinates of LLPs.	The results suggest that the introduction of IFRS in 2005 results in less earnings management behaviour of European banks and the effect is less pronounced for banks from countries characterised by stricter bank supervision, widely dispersed bank ownership and for banks that are cross-listed in the US.
Leventis et al. (2011)	To examine the change in earnings management behaviour using LLPs following IFRS adoption.	A sample of 910 bank-year observations related to 91 European banks over 1999-2008	Loan loss provisions (LLPs) are regressed on the determinates of LLPs	IFRS adoption period appears to result in a decline in earnings management behaviour by European banks.
Agostino et al. (2011)	To investigate whether there has been any improvement in the value relevance of accounting information following the mandatory introduction of IFRS	A sample of 1,201 bank-year observations in 15 EEA countries over the period 2002-2006.	The price model	They report an increase in the value relevance after IFRS adoption. Also, the value relevance of earnings increased following IFRS adoption for the different sub-samples used. For equity book value, the results are less clear-cut.
Manganaris et al. (2015)	To examine the changes in the value relevance of accounting information following IFRS adoption, and examine its relationship to conditional conservatism.	A sample of 2,223 firm-year observations related to 178 financial institutions from 15 EEA countries over 1998-2011.	The price and return models.	There is a significant increase (decrease) in the value relevance of earnings (book value) after mandating IFRS. The shift in the value relevance depends on institutional environment. Conditional conservatism is positively (negatively) related to value relevance prior to (post) mandatory IFRS adoption.

- Value relevance and the financial crisis

Author (s)	Research objective	Sample	Methodology	Primary findings
Barth et al. (1998)	To investigate the impact of firms' financial health on the pricing coefficients on of equity book value as well as net income.	A sample of 396 US firms that bankrupted and delisted over the period 1974-1993.	The price model	The results show that the valuation coefficient of equity book value increases over the period of five years before bankruptcy, whereas the estimated coefficient on net income tends to decrease over the same period.
Graham et al. (2000).	To evaluate the impact of Asian financial crisis in 1997 on the value	A sample of 8,116 firm-quarter observations in	The price model	Whereas the incremental value relevance of equity book value increases, that of net income decreases

	relevance of book value of equity and net income.	Thailand over the period 1992-1998.		following the financial crisis in Asia
Davis-Friday et al. (2006)	To evaluate the impact of Asian financial crisis in 1997 on the value relevance of book value of equity and net income.	A sample of 1,035 firms listed in Indonesia, South Korea, Malaysia or Thailand.	The price model	Their results indicate different effect of financial crisis in different countries. Further analysis shows that the institutional environment plays a role in the extent of changes in the value relevance.
Fen et al. (2010)	To evaluate whether a financial crisis affects the value relevance of specific components of the balance sheet and income statement.	4102 firm-quarter observations in Taiwan from the first quarter of 2007 to the first quarter of 2009.	The price model	The results show a significant decrease in the value relevance of net income components. The results for book value are less clear-cut as it varies based on industry classification.
Choi et al. (2011)	To investigate the changes in the value relevance of reported net income and its components around the Asian financial crisis 1997-1998.	A sample of 10,406 firm-years from nine Asian countries from 1995 to 2000	The regression of stock return on the different components of earnings.	They report a significant decline in the value relevance of discretionary accruals but no significant change in that of non-discretionary components.
Filip and Raffournier (2012)	To examine the impact of financial crisis in 2008 and 2009 on the accounting information quality.	A sample of 8,266 firms in 16 European countries over the period 2006-2009	Earnings management models.	The findings suggest a decrease in earnings management during the financial crisis. However, this is not the case for all the countries represented in their sample.
Iatridis and Dimitras (2013)	To examine whether there has been any change in the value relevance and earnings management during the financial crisis.	A sample of 582 firms listed in five European countries over the period 2005-2011.	The price model and earnings management models	The effect of financial crisis on the accounting information quality, measured by earnings management and value relevance, varies across five European countries.
Vyas (2011)	To examine the timeliness of write-downs reporting by US financial firms during the crisis period.	A sample of 66 U.S. financial firms that reported write down in the period 2007-2008.	A model to compare the timing of actual write downs to the devaluation that is implied in exposure-specific credit indices such the ABX	Actual write-downs are generally less timely compared to the devaluation implied by credit indices. Also the timeliness of write-downs tend to vary across banks.
Cohen et al. (2014)	To evaluate the earnings management behaviour by banks surrounding the financial crisis.	A sample of US banks that operate during the 1997 through 2009.	The regression of crash risk on the level of earnings management	Their findings suggest that earnings management by banks has little effect on downside risk during pre-crisis period, but appears to have a big impact during a financial crisis.
Beccalli et al. (2015)	To examine earnings management behaviour using LLPs by European banks	A sample of 487 bank-quarter observations related to 55 banks domiciled	Earnings management is measured by the residuals from a	The findings suggest that banks tend to engage in earnings management activities via LLPs before

	during the financial crisis.	in 14 Europe countries over 2004-2008.	regression of LLP on the business activities that determinate LLPs	the crisis but not in the crisis period.
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- Value relevance and institutional factors

Author (s)	Research objective	Sample	Methodology	Primary findings
Black and White (2003)	To examine the variation in the relative value relevance of equity book value and net income across countries.	A sample of 36,143 firm-year observations for firms listed in Germany, Japan and US over the period 1986-1998.	The price model	They report a variation in the value relevance of equity book value and net income across three countries
Prather-Kinsey et al. (2008)	To investigate the value relevance of book values and earnings before and after IFRS adoption in addition to cost of capital in common law and code law countries as well	A sample of 157 European listed companies over 2004 and 2006,	The price model and cost of capital model	The findings show a stronger effect of mandatory IFRS adoption on the value relevance of accounting information as well as cost of capital for code law group.
Lourenço and Curto (2008)	To assess whether accounting information quality is higher for common law countries before IFRS adoption and whether the value relevance varies across countries after IFRS adoption.	A sample of 348 firms listed in six European countries from 2003 and 2008	The price model	Accounting information tend to be higher in common law countries before IFRS adoption. There is an increase in the value relevance of accounting information after IFRS adoption in European countries with the exception of Germany and Italy.
Clarkson et al. (2011)	To evaluate the changes in the value relevance of accounting information following IFRS adoption.	A sample of 3,488 firms in 15 EU in 2004.	The price model	There has been no improvement in the value relevance for both sub-samples of code law and common law countries, and county-by-country analysis shows mixed results.
Fonseca and González (2008)	To examine the determinants of income smoothing using LLPs.	A sample of 3,221 bank-year observations from 40 countries	LLPs are regressed on previous LLPs, earnings before taxes and LLP, change in total loans, loan-losses allowance, bank capital and GDP in addition to the explanatory variables of interest.	The study documents that the level of income smoothing is determined by investor protection, disclosure quality, bank regulation and supervision, financial structure and development.
Anandarajan et al. (2011)	To analyse the impact of institutional environment and firm-specific characteristics on the value relevance	A sample of 813 financial firms from 38 countries over the period 1993-2004.	The price model	Their results suggest that institutional environment and firm-specific characteristics have an impact on the value

	of accounting information			relevance of accounting information of financial firms.
Curico and Hasan (2015)	To investigate earnings management using LLPs for Euro area banks versus non-Euro area credit institutions.	A sample of 491 banks in Europe over the period from 1996 to 2006.	Loan loss provisions (LLPs) are regressed on the determinates of LLPs	The study reports differences in the use of LLPs by banks across Eurozone versus non-Eurozone banks.

- Value relevance and corporate governance

Author (s)	Research objective	Sample	Methodology	Primary findings
Frankel et al. (2002)	To evaluate whether there is an association between auditor fees and earnings management as well as the market reaction to the disclosure of auditor fees.	A sample of 3,074 US firms in the year 2001	Earnings management models	The findings indicate a significant positive relation between non-audit fees and the likelihood of reporting a small earnings and there is a negative association between audit fees and the level of earnings management
Klein (2002)	To examine the relationship between the percentage of independent directors in the board of directors as and the audit committee, and the level of earnings management	A sample of 692 firm-year observations from the firms listed on the S&P 500 in 1992 and 1993.	Earnings management models	The result suggests a negative association between the percentage of independent directors and earnings management.
Xie et al. (2003)	To evaluate the role of the board of directors and the audit committee as well as the executive committee in reducing earnings management behaviour.	A sample of 282 firm-year observations for firms from S&P 500 index and have data for the years, 1992, 1994 and 1996.	Earnings management models	More independent directors in the board as well as the presence of corporate executives and investment bankers on audit committees are associated with lower level of earnings management. The same results for more meeting held by board of directors and audit committee.
Park and Shin (2004)	To examine the impact of board composition on earnings management behaviour.	A sample of 539 firm-year observations over the period 1991-1997.	Earnings management models	The number of directors from financial intermediaries as well as the board representation of active institutional shareholders tend to be associated with lower earnings management.
Larcker et al. (2007)	To evaluate the association between a large set of corporate governance factors and various accounting and economic measures	A sample of 2,106 firms that are from the US and their fiscal year end between June 2002 and May 2003.	The price model in addition to other measures for accounting information quality	The afflicted position of director in the board of director and audit committee is associated with lower value relevance, while the existence of old directors is associated with higher level of value relevant accounting information.

Kent et al. (2010)	To analyse the association between the characteristics of board of directors as well as audit committee, and earnings management.	A sample of 392 firm-year observations in Australia over the period 2001-2005.	Earnings management models	Strong corporate governance is related with higher quality discretionary and innate accruals.
Verriest et al. (2013)	To study the association between first time IFRS adoption quality as well as disclosure and corporate governance strength.	A sample of 223 European firms located in 15 countries and adopted IFRS in 2005 for the first time	IFRS adoption quality and disclosure measures are regressed on corporate governance factors	Firms with stronger corporate governance provide more transparent IFRS restatements in the Moreover, the strong corporate governance results in more extensive information disclosure.

Appendix II

Literature review on value relevance of Fair Value hierarchy

- Fair value studies before SFAS No. 157 and IFRS 7

- US literature

Author (s)	Research objective	Sample	Methodology	Primary findings
Barth (1994)	To examine whether the disclosed fair value estimates (and fair value gains and loss) of banks investment securities are reflected in share price (return) , in comparison to historical cost.	Over the period from 1971 to 1990 for a sample of US banks. 100 banks for price model and 87 for return mode.	The price and the return models in addition to the difference between fair values and book values of investment securities.	The results suggest that fair value estimates of investment securities are statistically associated with equity market value. For securities fair value gains and losses the results are mixed.
Barth et al. (1995)	To examine how fair value measures affect earnings volatility is reflected in market value of equity.	Over the period from 1971 to 1990 for a sample of US banks. Unbalanced sample over the years of study.	Stock price is regressed on net income before securities gains and losses conditional on the standard deviations of historical cost and fair value net income.	The fair value components of net income are more volatile than the part of historical cost, and stock price does not reflect this incremental volatility.
Ahmed and Takeda (1995)	To evaluate how investors value realised and unrealised gains and losses of investment securities held by banks.	3,276 US bank-quarter observations over the period 1986-1991.	Stock return is regressed on net income component and control variabels.	The results reveal a significant association between unrecognised gains and losses and firm stock return.
Nelson (1996)	To examine whether the fair value disclosures under SFAS No 107 are value relevant to investors.	sample of 146 (133) US banks in 1992 (1993)	Market value of equity is regressed on the book value of equity plus difference between fair value estimates and book value of investment securities. The return model plus the changes in fair value estimates.	The study findings suggest that only fair value measures of investment securities is reflected in share price but not those of net loans, deposits, long term debt, and off balance sheet financial instruments
Eccher et al. (1996)	To examine whether the fair value disclosures under SFAS No 107 are value relevant to investors.	The sample comprises of 296 (328) US bank holding companies in 1992 (1993).	Market value of equity is regressed on the book value of equity and difference between fair value estimates and book value of investment securities.	Results show that fair value measures of investment securities are value relevant. The fair value estimates of other financial instruments are value relevant in limited settings.
Barth et al. (1996)	To examine whether the fair value disclosures under SFAS No 107 are value relevant to investors.	The sample consists of 136 US banks over the two years 1992 and 1993.	Market value of equity is regressed on the book value of equity plus difference between fair value estimates and book value of investment	The findings suggest that the fair value disclosures of investment securities, loans, and long term debt are incrementally value relevant to their book values but not

			securities as well as control variables.	for deposits and off-balance sheet items.
Venkatachalam (1996)	To examine whether the disclosures of derivatives as off balance sheet items are value relevant (under SFAS No. 119)	99 US bank holding companies over the two years 1993 and 1994.	Market value of equity is regressed on the book value of equity plus fair value disclosures of derivatives, and the other off-balance sheet items.	Fair value disclosures on derivatives provide value relevant information to investors, which is incremental relative to fair value on-balance sheet items.
Seow and Tam (2002)	To evaluate the disclosed fair values of derivatives based on SFAS No. 107 and 119.	The sample comprises of 106 US firm-year observations over the period 1990-1996.	The return model in addition to variables for the recognised and disclosed amount of derivatives.	The empirical findings indicate that the disclosure is value relevant to investors.
Carroll, et al. (2003)	To examines the value-relevance of fair value accounting relative to historical cost accounting for investment securities held by closed-end mutual funds.	Using a sample of 143 US closed-end mutual funds over the period 1982-1997	Market value of equity is regressed on the book value of equity plus difference between fair value estimates and book value of investment securities. Return model plus the changes in fair value estimates.	The results report significant association between market value of equity (stock return) and the fair value of investment securities (fair value securities gains and losses).
Ahmed et al.(2006)	To examine the value relevance of mandatory recognition rather than disclosure of derivative fair values.	146 US bank over the period 1995-2000	Market value of equity is regressed on the book value of equity and recognised and disclosed fair values of derivatives	The recognised fair values of derivatives are value relevant but disclosed fair values are not.

- Non –US studies

Author (s)	Research objective	Sample	Methodology	Primary findings
Bernard et al. (1995)	To examine the reliability of mark-to-market accounting for price adjustment on investments and some off-balance sheet positions as well as loan loss provisions.	The sample includes 1,035 Danish bank-year observations over the period 1976-1989.	The variables under study are regressed on their lagged values, so related adjustments over time are considered as sign of manipulations.	The empirical findings reveal some evidence of manipulating loan loss allowance but not for price adjustments of investments and off-balance sheet items.
Drago et al. (2013)	To evaluate whether the fair value estimates for banks loans are value relevant to investors.	Using a sample of 83 banks listed on stock exchanges in Europe between 2005 and 2008.	The price model plus the difference between book value and fair value of loans and a set of control variables.	The estimated fair values of loans disclosed in the footnotes of are incrementally value relevant to investors.
Fiechter and Novotny-Farkas (2014)	To examines the value relevance of three categories of financial instruments reported based on fair values in accordance to IAS 39.	They use a sample of 999 bank-year observations listed on 50 countries over the period 2006-2009.	The price model.	The empirical findings reveal a lower value relevant of financial instruments designated at fair value compared to held for maturity. Bank-based countries are found to be associated with lower

				value relevance of fair values.
Barth et al. (2014)	To assess whether the reconciliation adjustments for net income are value relevant to investors.	Based on a sample of 1,021 listed firms in 15 EEA countries	The market value of equity is regressed on the book value of equity and net income under local GAAP in addition to the adjustment for net income to IFRS	The reconciliation adjustments provide relevant information to investors for valuation purposes. Adjustments related to IAS 39 are significant only for financial firms.

- Literature review on fair value hierarchy

- Literature review on SFAS No. 157

Author (s)	Research objective	Sample	Methodology	Primary findings
Kolev (2009)	To evaluate the value relevance of fair value hierarchy under SFAS No. 157	Sample of 349 US financial firm- year observations over the first two quarters of 2008	The price model where the book value of equity is disaggregated based on fair value hierarchy and non-fair value items.	Valuation coefficients on level 1 and 2 fair values are lower than corresponding coefficient on fair value at level 1.
Song et al. (2010)	To evaluate the value relevance of fair value hierarchy under SFAS No. 157	Sample of 1,260 US financial firm-year observations over the first three quarter of year 2008.	The price model where the book value of equity is disaggregated based on fair value hierarchy and non-fair value items.	Higher value relevant level 1 & 2 fair values in comparison to level 3. Strong corporate governance decreases the information asymmetry associated with fair values classified at level 3.
Goh et al. (2015)	To evaluate the value relevance of fair value hierarchy under SFAS No. 157.	A sample of 6,893 firm-quarter observations for financial firms listed on the US stock markets listed over 2008-2011.	The price model where the book value of equity is disaggregated based on fair value hierarchy and non-fair value items.	The coefficient on level 3 fair values is significantly lower than those on level 1 and 2. Moreover, the differences between the valuation coefficients tend to reduce over time
Fiechter, and Meyer (2010)	To investigate whether the discretion the managerial discretion inherent in fair value is used for the purpose of big bath accounting during the crisis period	A sample of 552 U.S. bank holding companies over the period from the first quarter of 2008 to the first quarter of 2009.	The nondiscretionary level 3 gains or losses is measured by the residual of reported level 3 gains and losses on a number of explanatory variables.	In times of financial crisis, financial firms with poor pre-manager performance appear to report higher discretionary Level 3 losses, compared to a control group.
Riedl and Serafeim (2011)	To investigate whether level 3 fair value assets tend to be associated with greater information risk and, hence, higher cost of capital,	A sample of 952 US financial firm-quarters from the second quarter of 2007 to the second quarter of 2008.	An implied asset betas are regressed on the three levels of fair value assets as well as non-fair value assets.	Higher cost of capital is related to level 3 fair values and firms' information environments can play role in mitigating information risk across the fair value estimates.
Liao et al. (2013)	To assess the association between the three levels of fair value hierarchy based	A sample of 2,856 US bank-quarter observations from	The bid-ask spread is regressed on the three levels of fair values	Bid-ask spreads is lowest for Level 1 fair values

	on SFAS No. 157 and information asymmetry	Quarter 1 2008 to Quarter 4 2009.	with a set of control variables	and highest for Level 3 fair values.
Huang et al. (2015)	To examine the association between cost of equity capital and the three levels of fair value.	A sample of 814 US financial firm-year observations over the two financial years 2008 and 2009.	The regression of cost of capital on the three levels of fair value in addition to a set of control variables	Firms' cost of capital tends to be positively associated with level 3 fair values. Also the positive association between level 3 fair values and cost of capital is lower for firms with strong governance.

- Literature review on IFRS 7

Bischof (2009)	To investigate whether there has been any improvement in disclosure quality after the mandatory adoption of IFRS 7	A sample of 171 banks from 28 European countries in 2007.	Disclosure quality is measured both quantitatively and qualitatively.	The study shows that there has been an improvement in disclosure quality after IFRS7 and disclosure quality varies across European countries.
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- Institutional environment, corporate governance and fair value

Beaver and Venkatachalam (2003)	To investigate the valuation coefficients on the different components of loan fair values	A sample of 869 US bank-year observations over the period 1992-1995.	Market value of equity is regressed on fair value assets and liabilities where loan fair values are disaggregated into components.	The discretionary component that is attributed as for signalling (opportunism) is positively (negatively) priced and statistically significant.
Aboudy et al. (2006)	To examine whether firms understate option value estimates and, thus, stock-based compensation expense disclosed under SFAS 123.	A sample of 3,368 US firm-year observations over the period 1996-2001.	The estimated values of option by firms are regressed on calculated values and other variables.	Evidence of understating option expense, and this tends to be higher for firms having greater incentives as well as opportunity to do so.
Hodder et al. (2006)	To examine the factors that drive managers' use of employee stock option model inputs	A sample of 1,748 firm-year observations related to firms in Standard & Poor's (S&P) 1500 over 1995-1998.	The difference between model inputs estimates against benchmarks (historic experience and industry benchmarks).	The study shows that managers exercise discretion over all the models to estimate the fair values of stock option.
Bartov et al. (2007)	To examine whether firms understate option value estimates (stock-based compensation expense) disclosed under SFAS 123	A sample of 9,185 US firm-years observation from 1996 to 2004	The estimated values of options by firms are regressed on historical stock-price volatility and calculated implied volatility.	Evidence of understating option expense and it is highly associated with managerial incentives and/or ability to do so.
Bischof (2009)	whether there has been any improvement in disclosure quality after the mandatory adoption of IFRS 7	A sample of 171 banks from 28 European countries in 2007.	Disclosure quality is measured both quantitatively and qualitatively.	The study shows that there has been an improvement in disclosure quality after IFRS7 and disclosure quality varies across European countries.

Fiechter and Novotny-Farkas (2014)	To examine the value relevance of three categories of financial instruments reported based on fair values in accordance to IAS 39	They use a sample of 999 bank-year observations listed on 50 countries over the period 2006-2009.	The price model.	The empirical findings reveal a lower value relevant of financial instruments designated at fair value compared to held to maturity. Bank-based countries are found to be associated with lower value relevance of fair values.
Song et al. (2010)	To evaluate the value relevance of fair value hierarchy under SFAS No. 157	Sample of 1260 US financial firm-year observations over the first three quarter of year 2008.	Ohlson model where the book value of equity is disaggregated based on fair value hierarchy	Higher value relevant level 1 & 2 fair values in comparison to level 3. Strong corporate governance decreases the information asymmetry associated with fair values classified at level 3.
Verriest et al. (2013)	To study the association between first time IFRS adoption quality as well as disclosure and corporate governance strength.	A sample of 223 European firms located in 15 countries and adopted IFRS in 2005 for the first time	IFRS adoption quality and disclosure measures are regressed on corporate governance factors	Firms with stronger corporate governance provide more transparent IFRS restatements in the Moreover, the strong corporate governance results in more extensive disclosure.
Bhat (2013)	To examine whether the association between the value relevance of fair value gains and losses risk management disclosure as well as corporate governance.	A sample of 176 listed US banks over the period 2001-2009	Stock return is regressed on net income, other compressive income and fair value gain and loss.	The results show a positive association between corporate governance and the level of risk disclosure and between the level of disclosure and the market pricing of fair value gains and losses.
Huang et al. (2015)	To examine the association between cost of equity capital and the three levels of fair value.	A sample of 814 US financial firm-year observations over the two financial years 2008 and 2009.	The regression of cost of capital on the three levels of fair value in addition to a set of control variables	Firms' cost of capital tends to be positively associated with level 3 fair values. Also the positive association between level 3 fair values and cost of capital is lower for firms with strong governance.

Appendix III

GDP growth and changes in non-performing loans to total loans

Table 1 GDP growth %

Country	2005	2006	2007	2008	2009	2010	2011	2012
Austria	2.14	3.35	3.62	1.55	-3.80	1.88	3.07	0.88
Belgium	1.89	2.63	3.00	0.95	-2.62	2.50	1.64	0.09
Bulgaria	5.96	6.47	6.91	5.75	-5.01	0.66	1.98	0.49
Cyprus	3.91	4.13	5.13	3.63	-1.67	1.30	0.40	-2.40
Czech Republic	6.44	6.88	5.53	2.71	-4.84	2.30	1.96	-0.81
Denmark	2.44	3.80	0.82	-0.72	-5.09	1.63	1.15	-0.66
Finland	2.78	4.06	5.18	0.72	-8.27	2.99	2.57	-1.46
France	1.61	2.37	2.36	0.20	-2.94	1.97	2.08	0.33
Germany	0.71	3.71	3.27	1.05	-5.64	4.09	3.59	0.38
Greece	0.89	5.82	3.54	-0.44	-4.39	-5.45	-8.86	-6.57
Hungary	4.26	3.96	0.51	0.88	-6.55	0.79	1.81	-1.48
Iceland	6.00	4.23	9.72	1.15	-5.15	-2.93	2.13	1.15
Ireland	5.67	5.47	4.93	-2.61	-6.37	-0.28	2.77	-0.31
Italy	0.95	2.01	1.47	-1.05	-5.48	1.71	0.59	-2.27
Lithuania	7.80	7.84	9.84	2.93	-14.74	1.33	6.00	3.70
Luxembourg	4.12	4.88	6.46	0.49	-5.33	5.14	2.61	-0.16
Malta	3.67	2.22	4.28	3.90	-2.80	4.30	1.40	1.10
Norway	2.59	2.30	2.65	0.07	-1.63	0.48	1.34	2.90
Netherlands	2.25	3.82	4.20	2.08	-3.30	1.07	1.66	-1.59
Poland	3.55	6.19	7.20	3.92	2.63	3.70	4.76	1.76
Portugal	0.77	1.55	2.49	0.20	-2.98	1.90	-1.83	-3.32
Romania	4.29	8.72	6.26	7.86	-6.80	-0.94	2.31	0.35
Slovenia	4.00	5.66	6.94	3.30	-7.80	1.22	0.61	-2.64
Slovak Republic	6.54	8.26	10.68	5.45	-5.29	4.83	2.70	1.60
Spain	3.72	4.17	3.77	1.12	-3.57	0.01	-0.62	-2.09
Sweden	2.82	4.69	3.40	-0.56	-5.18	5.99	2.66	-0.29
Switzerland	3.04	4.01	4.14	2.28	-2.13	2.95	1.80	1.11
United Kingdom	2.81	3.04	2.56	-0.33	-4.31	1.91	1.65	0.66

Source: The World Bank

Table 2 changes in non-performing loans to total loans (%)

Country	2005	2006	2007	2008	2009	2010	2011	2012
Austria	-3.7	5.3	-18.1	-15.1	18.3	25.8	-4.4	3.9
Belgium	-13.0	-36.0	-9.1	43.2	87.0	-9.1	18.2	13.4
Bulgaria	10.0	0.0	-4.5	14.5	167.2	85.5	25.6	11.0
Cyprus	-	-	-	-	25.5	23.8	71.8	94.2
Czech Republic	-2.5	-7.7	-34.3	18.6	63.2	17.7	-3.1	0.4
Denmark	-71.4	50.0	100.0	100.0	175.0	23.3	-10.1	62.6
Finland	-25.0	-33.3	50.0	33.3	50.0	0.0	-16.7	0.0
France	-16.7	-14.3	-10.0	4.4	42.7	-6.5	14.2	0.1
Germany	-17.3	-15.8	-22.3	7.5	16.1	-3.3	-5.3	-5.6
Greece	-10.0	-14.3	-14.8	1.6	48.8	31.1	58.3	61.3
Hungary	27.8	13.0	-11.5	29.7	124.7	46.4	36.4	17.8
Iceland	-	-	-	-	-	29.8	-36.6	-45.7
Ireland	-	11.5	17.6	205.6	409.6	27.3	29.3	52.5
Italy	6.0	-6.1	-12.0	8.7	50.4	6.2	17.1	17.1
Lithuania	-72.7	66.7	0.0	508.4	294.3	-2.7	-19.2	-21.4
Luxembourg	-33.3	-50.0	300.0	50.0	11.8	-63.1	53.5	-61.6
Malta	38.2	-21.0	-17.1	-7.3	13.3	20.5	-1.6	11.9
Netherlands	-	-	-	-	90.4	-11.5	-4.3	14.3
Norway	-30.0	-14.3	-16.7	44.7	76.8	18.9	10.8	-10.2
Poland	-26.2	-32.7	-29.7	-45.7	51.9	14.6	-5.1	11.6
Portugal	-25.0	-13.3	117.5	27.7	33.7	7.7	44.6	30.5
Romania	-82.7	28.6	43.6	6.2	187.3	50.2	20.9	27.3
Slovenia	-16.7	0.0	-28.0	134.2	37.4	41.8	43.8	28.5
Slovak Republic	92.3	-36.0	-21.9	-0.6	112.9	10.3	-3.8	-7.0
Spain	-0.8	-11.7	28.0	213.0	46.8	13.3	28.7	24.6
Sweden	-27.3	-86.9	-21.9	463.5	80.5	-6.1	-16.5	7.0
Switzerland	-44.4	-40.0	0.0	195.5	16.6	-17.2	-5.5	-4.6
United Kingdom	-47.4	-10.0	0.0	73.0	125.4	12.7	0.2	-7.6

Source: The World Bank

Appendix IV

Table 1 Country Break Down to test H2A a

Country	Financial firms (incl. Banks)			Banks only		
	Firms	Obs.	Percent	Firms	Obs.	Percent
Austria	5	40	2.60	5	40	3.42
Belgium	3	23	1.50	3	23	1.97
Denmark	14	109	7.10	14	109	9.33
Finland	5	40	2.60	2	16	1.37
France	30	240	15.63	22	176	15.07
Germany	7	56	3.65	4	32	2.74
Greece	11	80	5.21	11	80	6.85
Iceland	2	16	1.04	2	16	1.37
Ireland	4	32	2.08	4	32	2.74
Italy	21	168	10.94	19	152	13.01
Luxemburg	2	16	1.04	2	16	1.37
Netherland	6	44	2.86	3	20	1.71
Norway	17	136	8.85	15	120	10.27
Poland	11	88	5.73	11	88	7.53
Portugal	4	32	2.08	4	32	2.74
Spain	9	72	4.69	9	72	6.16
Sweden	9	72	4.69	5	40	3.42
Switzerland	3	24	1.56	-	-	-
UK	31	248	16.15	13	104	8.90
	194	1536	100	148	1168	100

Table 2 Country Break Down to test H3A

Country	Financial firms (incl. Banks)			Banks only		
	Firms	Obs.	Percent	Firms	Obs.	Percent
Austria	5	25	2.62	5	25	3.45
Belgium	3	14	1.47	3	14	1.93
Denmark	14	67	7.02	14	67	9.25
Finland	5	25	2.62	2	10	1.38
France	30	150	15.72	22	110	15.19
Germany	7	35	3.67	4	20	2.76
Greece	11	47	4.93	11	47	6.49
Iceland	2	10	1.05	2	10	1.38
Ireland	4	20	2.10	4	20	2.76
Italy	21	105	11.01	19	95	13.12
Luxemburg	2	10	1.05	2	10	1.38
Netherland	6	26	2.73	3	11	1.52
Norway	17	85	8.91	15	75	10.36
Poland	11	55	5.77	11	55	7.60
Portugal	4	20	2.10	4	20	2.76
Spain	9	45	4.72	9	45	6.22
Sweden	9	45	4.72	5	25	3.45
Switzerland	3	15	1.57	-	-	-
UK	31	155	16.25	13	65	8.98
	194	954	100	148	724	100

Table 3 Country Break Down to test H4A

Country	Financial firms (incl. Banks)			Banks only		
	Firms	Obs	Percent	Firms	Obs	Percent
Austria	2	10	2.13	2	10	3.13
Belgium	2	9	1.91	2	9	2.81
Denmark	3	15	3.19	3	15	4.69
Finland	4	20	4.26	2	10	3.13
France	8	40	8.51	6	30	9.38
Germany	2	10	2.13	1	5	1.56
Greece	2	6	1.28	2	6	1.88
Ireland	2	10	2.13	2	10	3.13
Italy	14	70	14.89	12	60	18.75
Luxemburg	2	10	2.13	2	10	3.13
Netherland	4	20	4.26	2	10	3.13
Norway	7	35	7.45	5	25	7.81
Poland	6	30	6.38	6	30	9.38
Portugal	3	15	3.19	3	15	4.69
Spain	4	20	4.26	4	20	6.25
Sweden	6	30	6.38	5	25	7.81
Switzerland	2	10	2.13	-	-	-
UK	22	110	23.40	6	30	9.38
	95	470	100	65	320	100

Appendix V

Table 1 The impact of IFRS adoption on value relevance (using lagged book value of equity)

VARIABLES	Coeff.	Financial firms (incl. Banks)		Banks (only)	
		Pre-IFRS (1998-2004)	IFRS (2005-2012)	Pre-IFRS (1998-2004)	IFRS (2005-2012)
<i>BVPS</i>	b_1	2.160*** (0.408)	1.535*** (0.116)	2.052*** (0.543)	1.486*** (0.0981)
<i>EPS</i>	b_2	2.761*** (0.954)	-0.0391 (0.150)	2.003 (1.382)	-0.153 (0.127)
<i>Constant</i>	b_0	-0.127 (0.491)	0.730*** (0.155)	-0.0736 (0.562)	0.721*** (0.139)
Year dummy D_t		Yes	Yes	Yes	Yes
Observations		1,092	1,341	832	1,019
No of firms		194	194	148	148
R ² (within)		0.438	0.591	0.392	0.644
Difference		0.153**		0.252***	

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the fixed effect estimation of the price model as follows: $P_{it} = b_0 + b_1BVPS_{it} + b_2EPS_{it} + \delta D_t + \varepsilon_{it}$. P_{it} is the market value of firm i three months following the end of fiscal year t . $BVPS_{it}$ is the book value of equity for firm i at the end of fiscal year t . EPS_{it} is the reported earnings of firm i over the fiscal year t and D_t is a dummy variable for year t . P_{it} , $BVPS_{it}$, and EPS_{it} are scaled by book value of equity at the beginning of year t .

The difference in the value relevance of accounting information between pre-IFRS adoption period (1998-2004) and IFRS adoption period (2005-2012) is measured by the difference in the within explanatory power of price model, $withinR^2$, over the two periods. The significance of the difference in within R^2 is tested based on Z statistics = $(R_{post}^2 - R_{pre}^2) / (\sigma_{R_{post}^2}^2 + \sigma_{R_{pre}^2}^2)^{0.5}$ where $\sigma_{R_{post}^2}^2$ and $\sigma_{R_{pre}^2}^2$ are the variance of coefficients of determinations of the within-group estimator using bootstrap methods following Agostino et al. (2011: 444). The results are reported for the entire sample of financial firms and for a sub-sample of banks.

Table 2 The impact of the crisis on value relevance (scaled by lagged book value of equity)

VARIABLES	Coeff.	Financial Firms (incl. Banks)	Banks (only)
<i>Crisis</i>	b_1	-0.739*** (0.277)	-1.017*** (0.233)
<i>BVPS</i>	b_2	1.585*** (0.214)	1.226*** (0.174)
<i>Crisis* BVPS</i>	b_3	-0.158 (0.263)	0.227 (0.218)
<i>EPS</i>	b_4	1.454** (0.592)	2.980*** (0.986)
<i>Crisis* EPS</i>	b_5	-1.652*** (0.586)	-3.228*** (0.974)
<i>Constant</i>	b_0	0.393* (0.213)	0.485*** (0.181)
Year dummy D_t		Yes	
Observations		1,341	1,019
Number of firms		194	148
R ² (within)		0.607	0.671

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the fixed effect estimation of $P_{it} = b_0 + b_1Crisis + b_2BVPS_{it} + b_3Crisis * BVPS_{it} + b_4EPS_t + b_5Crisis * EPS_{it} + \delta D_t + \varepsilon_{it}$ over the period 2005-2012, where *Crisis* is a dummy variable coded 1 for the years of crisis period (2008-2012) and zero otherwise. P_{it} is the market value of firm i three months following the end of fiscal year t . $BVPS_{it}$ is the book value of equity for firm i at the end of fiscal year t . EPS_{it} is the reported earnings of firm i over the fiscal year t and D_t are year dummy variables. P_{it} , $BVPS_{it}$, and EPS_{it} are scaled by book value of equity at the beginning of year t . The results are reported for the entire sample of financial firms and for a sub-sample of banks.

Table 3 Value relevance of fair values hierarchy using lagged book value of equity as an alternative scaling method

VARIABLES	Coeff.	Pane A	Panel B		
			Test	F-stat	p-value
<i>NFVNA</i>	b_1	0.312*** (0.0802)	$FVNA1 = FVNA3$	10.45	0.0013***
<i>FVNA1</i>	b_2	0.893*** (0.125)	$FVNA1 = FVNA2$	7.28	0.0071***
<i>FVNA2</i>	b_3	0.383** (0.154)	$FVNA2 = FVNA3$	0.31	0.5752
<i>FVNA3</i>	b_4	0.444*** (0.121)	$FVNA1 = NFVNA$	22.15	0.0001***
<i>EPS</i>	b_5	3.804* (2.080)	$FVNA2 = NFVNA$	0.51	0.4761
Constant	b_0	-0.363 (0.339)	$FVNA3 = NFVNA$	6.67	0.0100**
Year Dummy		(4.248)			
Observations		685			
No of firms		184			
R-squared		0.722			

Notes: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. The table reports the OLS estimation of the following equation $P_{it} = b_0 + b_1NFVNA_{it} + b_2FVNA1_{it} + b_3FVNA2_{it} + b_4FVNA3_{it} + b_5EPS_{it} + \delta D_t + \varepsilon_{it}$, where P_{it} is the market value of firm i three months following the end of fiscal year t . $FVNA1_{it}$, $FVNA2_{it}$ and $FVNA3_{it}$ are fair value of level 1, level 2 and level 3 net assets for firm i as reported at the end of fiscal year t . EPS_{it} is the reported net income of financial firm i for the fiscal year t and D_t is a dummy variable for year t . In this form of the model all the market and accounting variables are scaled by lagged book value (i.e. book value of equity for firm i as reported at the end of fiscal year $t-1$). Due to missing data on the lagged book value of equity, the number of observations drops to 685 firm-year observations related to 184 distinct firms listed in the European Economic Area (EEA) and Switzerland over the period 2009-2012. While Panel A shows the results of the regression, Panel B offers F-statistics testing the differences between the estimation coefficients.

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