STOCKHOLM SCHOOL OF ECONOMICS
Department of Accounting
3350, Master Thesis in Accounting and Financial Management
Spring 2013

The Relevance of Fair Value Accounting and the Merits of Transparency

Abstract

The outburst of the financial crisis in late 2007 in the US coincided with a wave of new accounting regulations related to Fair Value Accounting. One of the new standards, SFAS 157, introduced new disclosure requirements related to the way fair values should be estimated and thus had a significant impact over the financial reports of banks and other financial institutions. The newly established three-level measurement hierarchy for fair values gives us the opportunity to test the impact of management discretion over the usefulness of financial information. Using an extensive sample of US financial institutions between 2007 and 2012, we find, contrary to expectations and prior research, that the relevance and reliability of fair values is rather unrelated to the amount of management discretion used in determining the values. In general, our findings suggest that investors perceive all fair values as almost equally relevant, irrespective of the inputs used to determine those values. Furthermore, we document an increase in the decision usefulness of balance sheet information in the years after the introduction of SFAS 157 in comparison to the period 2003-2007. Therefore, our general conclusion is that the increased transparency has eliminated much of the uncertainty related to mark-to-model estimates. Hence, even if investors do not differ much in their valuation of the three categories of fair values, they do value the increased transparency and comparability arising from the increased disclosure requirements.

Key words: Fair value accounting, Value relevance, Management discretion, SFAS 157

Authors: Petya Yalamova (40324@student.hhs.se) and Erik Kuritzén (40330@student.hhs.se)

Tutor: Henrik Andersson

Dissertation: 31st May, 2013

Acknowledgments: We would like to thank Henrik Andersson, Per-Olov Edlund, Katerina Hellström, Anja Hjelström, Milen Stoyanov, and Walter Schuster for helpful comments and suggestions.

Table of Contents

List of Tables and Figures in Appendix

Abbreviations

AAA	American Accounting Association
ASU	Accounting Standards Update
BM	Book-to-Market ratio
BVEQ	Book Value of Equity per share
BVEQ*	Book Value of Equity per share after adjusting for preference shares
BVPS	Book value per share
E	Earnings
EPS	Earnings per share
FASC	Financial Accounting Standards Committee
FASB	Financial Accounting Standards Board
FVA	Fair Value Accounting
FVA ps	Fair Value Assets per share
FVA/TA	Fair value assets divided by total assets
FSP	FASB Standard Proposition
IASB	International Accounting Standards Board
MVE	Market Value of Equity
NASDAQ	National Association of Securities Dealers Automated Quotations
NFVA/TA	Net fair value assets divided by total assets
NFVA	Net Fair Value Assets per share
NFVA1	Net Fair Value Assets Level 1 per share
NFVA2	Net Fair Value Assets Level 2 per share
NFVA3	Net Fair Value Assets Level 3 per share
NNFVA	Net Non-Fair Value Assets per share
OTC	Over-the-counter
P	Price
SFAS	Statement of Financial Accounting Standards
TA ps	Total Assets per share
TBVEQ	Total Book Value of Equity
TFVA ps	Total fair value assets per share
TFVL ps	Total fair value liabilities per share
TL ps	Total Liabilities per share

1. Introduction

The onset of the financial crisis in late 2007, highlighted by the collapse of numerous financial institutions, including Bear Sterns, Lehman Brothers, and Wachovia, has occupied the business world with discussions regarding the considerable risks faced by the entire financial system. Different parties have offered various explanations for the crisis, some of them have been the burst of the housing bubble, inadequate legislation, and excessive securitization (Barth et al., 2010). Significant attention has also been paid to the role of financial accounting, and more precisely, the measurement of financial instruments at fair value. The bankruptcy of the Swedish HQ Bank is only one of many collapses which has been associated with the bank's trading activities, and the underestimation of the market risk exposure of the bank's portfolio (Finansinspektionen, 2010).

Fair value accounting has been highlighted on several occasions to have caused the financial crisis. Just a few weeks after the collapse of Lehman Brothers in 2008, former Federal Deposit Insurance Corporation (FDIC) Chairman William Isaac expressed concerns that this measurement approach was responsible for the credit crunch (CNBC, 2008). By marking to market assets for which there were no market prices available, approximately $5 trillion of bank lending was destroyed. As a result, banks did not have capital to lend (Isaac, 2008). Put it differently, the former FDIC chairman criticized the process of measuring assets at market prices when those do not reflect the true economic value of the assets´ future cash flows. Milder allegations state that fair value accounting contributed to the crisis by exacerbating it through having a contagious effect (American Bankers Association, 2008, Wallison, 2008, Whalen, 2008, Forbes, 2009, Laux et al., 2010). Significant research literature, however, points out that attempts have been made to "shoot the messenger" instead of focusing on the real troubles, such as financial illiteracy, poor investments, mortgage innovations, inadequate capital requirements, short-term debt financing, and the failure of rating agencies to properly assess risk (Laux et al., 2010, Ryan, 2008). Furthermore, it has been argued that much of the controversy is due to confusion about the concept and application of fair value, and the purpose of the accounting reporting in general (Laux, 2009).

The purpose of financial reporting is to provide information useful to external decision makers such as investors, lenders and creditors. However, financial accounting measures have been used by other parties as well. One of them is regulators who have based their capital requirements on the measure of capital defined by FASB. However, regulators are not obliged to do so and have indeed in some cases set up rules based on other measures (Laux et al., 2010). This interaction

between financial reporting and capital requirements, however, has created problems, specifically highlighted during the financial crisis (Heaton et al., 2010). The negative impacts of fair value accounting over the real economy can be avoided by measuring capital at adjusted book values, or by redefining capital requirements to be procyclical (Heaton et al., 2010).

Managing the relationship between financial reporting information and capital requirements is not the primary objective of standard setters. They should rather aim at increasing the relevance and faithfulness of the accounting information for external users of financial reports, since these are the primary objectives of financial reporting (Conceptual Framework for Financial Reporting, 2010). Following this, our paper will not focus on the interdependence between fair value accounting and financial stability. Rather, we aim to bring attention back to the traditional issue of the decision usefulness of financial information.

Thus, the purpose of the paper is to investigate how investors perceive the decision usefulness of financial information.

Considering the nature of our subject, there is no lack of related previous research. However, what distinguishes our study from prior literature is that we investigate the decision usefulness of financial information over time by using a comprehensive sample. It includes observations from 2003-2012, thus capturing the decision usefulness of financial information both before and after the crisis in 2008. The extensive time period and sample size, unprecedented in similar research, yields us a strong advantage compared to previous papers within the field. By using a sample of this size and diversity, spanning over years characterized by very different economic conditions, we provide a more complete study investigating the relevance and reliability of the balance sheet information.

Besides changing economic conditions, the time period captured by our study has been characterized by the implementation of new accounting standards. The introduction of SFAS 157 in late 2007 established a comprehensive framework for fair value definition, measurement and disclosure requirements. SFAS 157 emphasizes that fair value accounting does not mean the direct use of market prices only. Instead it includes the use of valuation techniques and market inputs other than quoted market prices when such are not available for identical assets and liabilities. The different kinds of inputs have been categorized into three levels – observable market prices (Level 1), non-observable market prices (Level 2), and valuation techniques (Level 3), thus creating a fair value hierarchy. Examining the change in relevance of financial information before and after late 2007 could provide us with useful insights on how the increased

disclosure requirements related to the different valuation inputs have affected the value relevance of accounting information after 2007 in comparison to the period beforehand.

Furthermore, the information disclosed in accordance with SFAS 157 gives us the opportunity to examine how the degree of management discretion is related to the decision usefulness of fair value accounting. Several studies related to this topic (Kolev. 2009; Goh et al., 2009; and Song et al., 2010) have already been published. A common finding of these is the lower relevance of mark-to-model accounting values (Level 3) in comparison to mark-to-market accounting values (Level 1 & 2). As a reason for this difference, researchers have discussed the perceived reliability of the estimates – the lower the reliability, the lower the relevance. However, previous research has mainly been based on observations from one year only, which raises concerns regarding the overall reliability of the conclusions.

These concerns motivate our decision to use a superior sample of panel data, in order to draw more reliable conclusions regarding the relevance of the different fair value estimates.

Using a sample of 8949 unique observations for the period 2007-2012, we find in fact that results based on a larger data set differ from the ones presented in previous studies. The economic downturn in late 2007 and 2008 has likely had an adverse impact on their results.

The introduction of SFAS 157 in late 2007 was followed by numerous amendments and updates in the years afterwards. The main purpose of these amendments has been to provide additional guidelines for the use of Level 2 and Level 3 inputs when estimating fair values. Thus, the difference in the relevance of the fair value categories might have fluctuated over time. Such a change has not been a topic of previous research. However, studying it might provide insights on whether or not the alteration of standards has resulted in more relevant and reliable financial reporting. In addition, we examine whether the relevance of different fair values is sensitive to certain characteristics of the financial institutions.

The remaining part of the document is organized as follows: Section 2 offers an overview of the fair value accounting concept, Section 3 discusses related previous research, Section 4 develops the hypotheses, Section 5 discusses the research design, Section 6 outlines the sample selection and data of the study, Section 7 presents the findings, and Section 8 concludes.

2. Historical Background and Institutional Framework

2.1. What is Fair Value Accounting

In its basic form, FVA refers to the reporting of assets and liabilities on the balance sheet at fair value and the recognition of changes in those fair values in the statement of financial performance as gains and losses (Laux et al., 2010).

Definition: The definition of fair value is "the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date" (SFAS 157). The definition implies that the fair value should be measured using the theoretical exit price as opposed to the entry price, ignoring any aspects of historical cost. The theoretical exit price, as stated above, means that the actual exchange does not necessarily have to take place, but could instead be the price that would be applied if a transaction took place. Consequently, forced-sale prices, also known as fire sale prices, are not to be used in measuring fair value.

Valuation techniques: SFAS 157 outlines three valuation techniques that shall be employed when measuring fair value: the market approach, the income approach, and the cost approach. The market approach uses prices of identical or similar assets and liabilities in market transactions; the income approach is often based on present value of future discounted cash flows; while the cost approach focuses on the amount currently required to replace an asset (King, 2008).

2.2. Historical background of the use of Fair Value Accounting

2.2.1. Fair Value Accounting during the 20th century

The concept of Fair Value has been used in accounting records since the 19th century (Magnan, 2009). Replacement cost values have been used for a number of balance sheet items and income statement entries – for example inventories, fixed assets, depreciation and so on (Rorem, 1929). However, the use of replacement cost to write up asset values during the 1920s resulted in flagrant overvaluations. This became apparent during the 1930s (Mathews, 1965). Due to the abusive valuation practices by that time, fair values were widely replaced by historical cost by 1930s. During the following decades, fair value measurement was merely discussed, and not used in financial accounting since it was associated with its former abusive application. Later on, however, fair values entered the financial reporting once again.

The bitter experiences from the past seemed to have been forgotten and renewed optimism had been built with regards to fair value accounting. Many trading-oriented financial institutions, investor associations, and accounting academics today share the belief that fair value accounting benefits investors compared to alternative measurement approaches, including amortized cost accounting, since fair values are more accurate, timely, and comparable across different firms and positions even in the conditions of market bubbles (Ryan, 2008). Besides, FVA has been said to prevent firms from managing their incomes through trading gains, since gains and losses are recognized when they occur, rather than when they are realized. It is also important for investors to update their expectations about future cash flows on the basis of new information on a timely basis, and that is exactly what fair value accounting does (Ryan, 2008). These are some of the reasons why FVA has been so warmly re-welcomed in the accounting world.

Since the 1980s fair value measurement has been required by FASB (either in note disclosures, or directly in the financial statements) (Godfrey et al., 2010), and it was effectively re-established during the 1990s. In 1991, SFAS 107 *Disclosures about fair value of financial instruments* was issued. It defines fair value as: "the amount at which the instrument could be exchanged in a current transaction between willing parties, other than in a forced or liquidation sale". At that time, both quoted market prices and management estimates were accepted as fair values.

In 1993 SFAS 115 *Accounting for certain investments in debt and equity securities* established the use of fair values for the measurement of some securities. SFAS 115 introduced a classification of equity and debt securities into three categories: held-to-maturity, trading, and available-for-sale securities. The other big category of financial instruments, loans and receivables, were split into two broad categories: held-for-investment or held-for-sale (mainly addressed in standards such as SFAS 65, SFAS 5, SFAS 114, and SFAS 107). At initial recognition, each category of financial instruments is measured at fair value, but are subsequently all subject to different measurement approaches (see *Figure A 1: The classification and measurement of financial instruments*). *Held-to-maturity* is *debt securities* measured at amortized cost, and the changes in their value are accounted for in the income statement. *Trading securities* include *debt and equity securities* purchased and held for the purpose of sale in the short-run. They are measured at fair value at the end of each reporting period, and their unrealized gains and losses are to be included in net income. The third broad category, *available-for-sale securities,* includes debt and equity securities that are neither held-to-maturity, nor for trading. They are measured at fair value, and the unrealized holding gains and losses from the changes in their fair values are included in other comprehensive income and in the shareholders' equity section, however not in net income. Loans made with the intent to be

held as investment are reported at amortized cost, and a disclosure about their fair value is provided only in the notes (SFAS 107). Held-for-sale securities are reported at the lower of cost or fair value with declines in value reported in net income.

In 1998 SFAS 133: *Accounting for Derivative instruments and hedging activities,* was issued. According to SFAS 133, derivatives are to be measured at fair value. With respect to the constant innovations occurring on the market for derivatives and hedges, it has been extremely challenging for regulators and standard setters to follow the development pace in the area. Indeed, the accounting for derivative instruments and hedging activities has been mentioned with regards to a number of recent scandals, one of which is the bankruptcy of the Swedish financial institution HQ Bank as already mentioned.

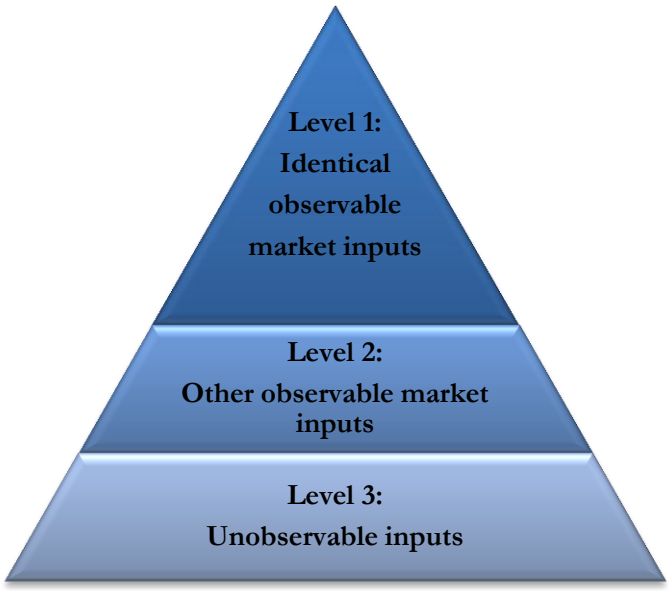
The mixed model of measurement of financial instruments reflects their complex nature. It often allows firms to choose the measurement attribute they desire for a position through how they classify the position. According to SFAS 115, a firm may choose to classify a security as any of trading, available for sale, or held to maturity, and thereby obtain one of the three different accounting treatments. Amortized cost rather than fair value seems to be the recommended measurement approach for financial instruments when companies intend to hold the positions to maturity, since firms will eventually receive or pay the promised cash flows on the positions (Ryan, 2008). However, Ryan (2008) points out that changes in risk-adjusted discount rates do yield economic gains and losses to the current holders of the positions compared to the alternative of acquiring identical positions at current rates regardless of whether firms intend to dispose of the assets before maturity or not. Besides, such a mixed attribute model can make effective risk management techniques by companies appear to be speculation, and vice-versa. Thus, a shift from a mixed-attribute model to fair value accounting for all financial institutions' financial instruments might increase consistency, and thus the decision usefulness of the financial reporting (Ryan, 2008). Meanwhile, amortized costs could be required in disclosures since they are useful for specific types of investment and other decisions (Ryan, 2008).

2.2.2. Fair Value Accounting during the 21st century

The use of fair value accounting has increased significantly during the last decade. After being initially reintroduced mainly for the measurement of financial instruments, fair value accounting is today applicable not only to financial instruments but also to a wide range of other asset classes. Fair value accounting is nowadays used in acquisition analysis, investment property, leases, and biological assets to name some. However, fair values are not used for financial instruments such as loans and debt securities held-to-maturity

In an attempt to align the common perceptions of fair value and to provide a comprehensive framework for fair value definition, measurement techniques and disclosure requirements, the FASB issued a new accounting standard in September 2006 - SFAS 157: *Fair Value Measurement*. It is effective for financial statements issued for fiscal years beginning after November 15, 2007, and interim periods within those fiscal years[i]. It has been said that SFAS 157 did not enhance the application of fair value but rather increased consistency and comparability (Song et al., 2010). What is often described as the most significant component of SFAS 157 is the introduction of a fair value hierarchy, prioritizing into three levels the inputs to valuation techniques that are to be used to measure fair values of assets and liabilities, and disclosures related to those. The highest level, Level 1 inputs, is quoted market prices in active markets for identical assets and liabilities. When such inputs are used, assets and liabilities are said to be marked-to-market. If Level 1 inputs are not directly observable, Level 2 inputs are used – observable prices in active markets for comparable assets and liabilities or observable market prices in inactive markets for identical assets and liabilities. At the lowest level of the hierarchy are level 3 inputs. Those inputs are unobservable and include modeling and management's assessment. Using level 3 inputs in the estimation of fair values is commonly referred to as the mark-to-model approach (Laux et al., 2009). If unobservable inputs are necessary, they should "reflect the reporting entity's own assumptions concerning the inputs market participants would use in pricing the asset or liability", in addition to being based on the best information available to the reporting entity (SFAS 157).

Figure 1: Hierarchy of inputs according to SFAS 157



After the initial issue of SFAS 157 many questions and concerns were expressed with regards to the new standard. In order to address some of the issues and concerns raised, FASB issued several amendments of the standard. FSP FAS 157-1 (February 14, 2008) was issued to address the fair value measurements of lease classifications; FSP FAS 157-2 was issued to amend the effective date of FAS 157 delaying it until November 15, 2008 for non-financial assets and liabilities. However, these amendments did not treat other more debated issues, such as the notion that using market prices as Level 1 observable inputs would cause many companies to significantly devalue many of the assets and liabilities they held. In addition, it was argued that the new standard could create a substantial liquidity-induced spread between Level 2 or Level 3 fair values and the price they would be sold for in an active market, since active markets may not exist for the asset (or liability) (Landsman et al., 2012). The concerns with fair value increased during the financial crisis, when a virtual collapse in the trading of financial instruments was experienced in many markets, particularly those related to mortgages and credit-related receivables. In response to that, FSP FAS 157-3 (October 10, 2008) was issued to provide additional guidance to the application of fair value measurements in inactive markets. This amendment relaxed the measurement requirements with regards to financial assets that were no longer traded in active market and allowed companies to find a valuation alternative other than a zero market value when such securities were no longer traded in an active market (Laux et al, 2009).

However, the initial amendments of SFAS 157 did not address how a reporting entity's own judgments should be taken into account in an inactive market, how available inputs that exist

within an inactive market should be assessed, and how the use of market quotes should be employed when measuring fair value in a market with little or no activity (Olson, 2010). The need for additional guidance and investigation of mark-to-market accounting was also outlined in the Emergency Economic Stabilization Act enacted by the US Congress (October 3, 2008). In response to the criticism and the Congressional pressure, the FASB issued three FSPs in April 2009:

- FSP FAS 157-4: *Determining Fair Value When the Volume and Level of Activity for the Asset or Liability Have Significantly Decreased and Identifying Transactions That Are Not Orderly*,
- FSP FAS 115-2 and FAS 124-2: *Recognition and Presentation of Other-Than-Temporary Impairment*s, and
- FSP FAS 107-1 and APB 28-1: *Interim Disclosures about Fair Value of Financial Instruments*.

The most significant of these amendments is said to be FSP FAS 157-4. Its overall message could be interpreted as "it is the market participant's assumptions that should be employed in estimating fair value, not the reporting entity's assumptions with inside information regarding specific assets" (Cheng, 2009). Other effects of the amendments were the improved guidelines in the application of Level 3 instead of Level 1 or Level 2 inputs when determining impairment charges.

In addition, the amendment allowed the impairment charge to be split between income and other comprehensive income, which effectively reduced the effect of impairments on regulatory capital (Landsman, 2012). Regarding the disclosure requirements, the new amendment required entities to disclose the inputs and valuation techniques used to estimate fair value not only on an interim but also on annual basis, contrary to the initial requirement for annual disclosures only.

Afterwards further updates have been issued. Some of them are listed below:

- ASU 2009-05, *Fair value measurements and disclosures (Topic 820): Measuring liabilities at fair Value* - provides guidance on measuring liabilities at fair value.
- ASU 2009-12, *Fair value measurements and disclosures (Topic 820): Investments in certain entities that calculate net asset per share (or its equivalent)* - provides guidance on the measurement of fair values of investments in entities without quoted market prices.
- ASU 2010-06, *Fair value measurements and disclosures (Topic 820): Improving disclosures about fair value measurements* - enhances the disclosure requirements for fair value measurements.

3. Previous Research

As the relevance of the financial reporting to investors, lenders and creditors is a key quality determining the decision usefulness of accounting information according to both the FASB and IASB (see *Figure A 2: Qualities of Financial Reporting)*, examining the relevance of the information in financial reports from investors' perspective is expected to be of interest not only to the research community but also to the standard setting boards (Barth et al., 2001). Information is relevant if it is capable of making a difference in the decisions made by users. This can be achieved when the financial information has predictive value (can be used as an input to predict future outcomes), and confirmatory value (provides feedback), or both (Conceptual framework for financial reporting, 2010). Based on the definition that accounting information is value relevant when it influences investors' economic decisions, together with the assumption that investors' valuation of a company is reflected in its stock price, Ohlson (1995) argues that the relevance of accounting information could be measured by examining its relation with a company's stock price. This operationalization of the term relevance is the one which will be employed in this study as well[1]. The other key quality making the accounting information useful for decision making is faithful representation (reliability). Reliability is achieved when the accounting information is complete, neutral and free from errors (see *Figure A 2: Qualities of Financial Reporting).*

3.1. Relevance of fair value estimates for financial instruments before 2008

There are a number of previous research papers investigating the value relevance and reliability of financial reporting information related to financial instruments. Considerable attention has been given to banks since their balance sheets are largely composed of financial instruments, of which a substantial part is measured at fair value. For the period before the initial introduction of standards that set a common definition and measurement approach to fair values (SFAS 107 and SFAS 115 in early 1990s), Barth (1994) investigates and confirms the value relevance and reliability of fair value estimates for investment securities for the period 1971-1990. This is done by estimating the incremental explanatory power of fair values over historical costs for the stock prices of the examined banks. Petroni et al. (1995) also find that share prices can be explained by accounting fair values of equity investments and U.S. Treasury investments. However, the research of Petroni et al. (1995) concludes that disclosures about the fair value of other types of investment securities (such as municipal and corporate bonds) do not have additional explanatory power over historical costs for the stock prices.

[1] See the section hypothesis development for more detailed discussion on the model.

Other previous research has focused on the value relevance of fair value disclosures related to loans, deposits and long-term debt (Barth et al., 1996, Eccher et al, 1996, Nelson, 1996). By examining the association between the market value of banks' common equity and fair value estimates, Nelson (1996) suggests that fair values for such financial instruments are not value relevant, whereas Eccher et al. (1996) finds value relevance of loans in only limited settings. In contrast, Barth et al. (1996) argues that fair values of loans are incrementally informative and reflect information about the default and interest rate risk of those loans. Venkatachalam (1996) examines the value relevance of banks' derivatives disclosures for a sample of banks in 1993 and 1994. The study of Venkatachalam suggests that off-balance sheet fair value estimates for derivatives have incremental explanatory power for the variation in bank share prices.

Carroll et al. (2003) finds an association between stock returns and fair value securities gains and losses, and argue that there is incremental value relevance of fair value information even for securities traded in thin markets. Khurama et al. (2003) support the notion that fair values are more relevant when objective market-based measures are readily available. Their research suggests that fair values are more relevant than historical cost for available-for-sale securities, and equally relevant for held-to-maturity debt securities. Moreover, they argue that loans and deposits are not actively traded in well-established markets, resulting in more subjective fair value estimates and hence less informative than historical cost. Plantin et al. (2008) argue that measurement systems reflecting transaction prices would provide a more accurate picture of the current risk profile of firms so that investors could take better disciplining and corrective actions on firms' decisions. In addition, fair values have been said to enhance consistency because they reflect the same type of information in every period (Barth et al., 2008).

Besides the advantages of fair value accounting, highlighted above, the use of fair value accounting have raised some concerns as well. For example, transaction prices of some asset classes (such as loans and CDOs traded primarily over the counter) can be far away from the ideal prices at hypothetically frictionless competitive markets and hence balance sheet values could change due to short-run fluctuations in the market, and not due to changes in the fundamental values of the assets and liabilities and their value at maturity (Allen et al, 2008). Thus, Allen et al. (2008) argue that using market prices to value the assets of financial institutions may not be beneficial when financial markets are illiquid. However, the issue of valuation at times of market illiquidity was addressed by the introduction of SFAS 157 and its subsequent amendments and updates. The establishment of the fair value hierarchy clarified how companies should use unobservable inputs or other valuation techniques to value illiquid assets. Using a

global sample of banks applying IFRS during the period 2006-2008, Fiechter et al. (2011) support the claim that fair values are value relevant, nonetheless they experience a substantial discount during the crisis in 2008. Fiechter et al. also find that the pricing of fair values differs across firm-specific and other institutional factors.

Thus, there is lots of research focusing on the value relevance of the accounting fair value disclosures for different categories of financial instruments depending on their characteristics, legal form and intent to use. The overall implications are that the decision usefulness of fair value estimates increases when these estimates are based on market information rather than on management discretion (AAA FASC, 2005).

3.2. Relationship between value relevance and reliability

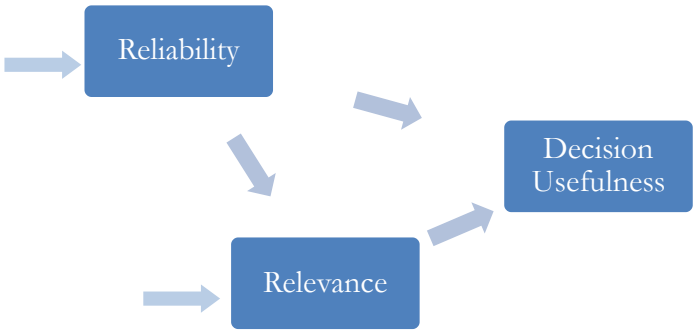
The majority of the papers discussed provide support for the notion that fair values are relevant to investors, based on findings of statistically significant coefficients (with the appropriate signs) in regressions between equity values and reported fair values. Thus, an accounting amount is generally defined as relevant when it has predictive association with equity market values (Barth, 2001). This approach is known as value relevance and it has been the most commonly used approach in academic literature to operationalize the relevance of accounting information as defined by FASB (The Conceptual Framework). However, accounting information can be value relevant without being decision relevant if it is preceded by more timely information. Nevertheless, Barth et al. (2001) points out that to be relevant information does not have to be new to a financial statement user (according to FASB). An important role of the preparers of financial statements is to summarize or aggregate information that might be available from other sources in order to provide easy access to information for external stakeholders. That is why we will also use value relevance as an operationalization of the relevance of accounting information as defined by FASB.

A more significant issue with that operationalization of the term is, however, that value relevance generally tests the relevance and reliability of an accounting amount jointly. It is difficult to test the two features separately. In other words, value relevance is empirically an operationalization not only of relevance but also of reliability as defined by FASB. The reason for this is that the accounting amount will be significantly related with share prices only if the amount reflects information relevant to investors in valuing the firm and is considered reliable enough to be reflected in share prices (Barth et al., 2001). Since equity value tests do not distinguish between relevance and reliability, they are subject to significant interpretation difficulties (O'Brien, 2005).

Indeed, there is no consensus on how the distinction between relevance and reliability should be operationalized, or what the relationship between them is.

A convincing argument, however, has been provided by Kadous et al. (2011) who argue that the relevance of an economic construct is influenced by factors underlying the reliability of its measurement (i.e., potential for bias and error). Thus, there is not only a positive relationship between relevance and reliability (McCaslin et al., 1983; Duncan et al., 1988), but also causality between the two (Kadous et al., 2011). Hence, if reliability is affected, relevance is influenced as well, with the two of them moving in the same direction. Therefore, we make no distinction on how certain factor affects the relevance or the reliability of the financial information, since we believe that it in either case result in an impact on the overall relevance of the information.

Figure 2: Relationship between relevance and reliability



Hence, examining the features which boost reliability would provide further insights about the factors associated with higher relevance of the accounting information as well. Dietrich et al. (2000) find that the reliability increases when fair values are obtained from external appraisers and audited by one of the larger international accounting firms. Barth et al. (2008) discuss that limiting management's opportunistic discretion in determining accounting amounts could increase the quality of accounting information. On the other hand, increased discretion, when it is not opportunistic, might improve predictive accuracy by allowing the management of a company to incorporate and convey private information in their estimates (Hodder et al., 2006). In line with Hodder et al. (2006), Maines et al. (2006) conclude that accounting standards permitting preparers the latitude to use accounting judgment and estimation can lead to more or less accounting information reliability, depending on how preparers use that latitude. As another factor affecting the informativeness of accounting information, AAA FASC (2005) test and confirms that explicitly reporting the process for determining the fair value estimates can be incrementally informative to users of financial statements.

3.3. Relevance of fair value estimates for financial instruments after 2008

3.3.1. New research perspective

More factors potentially influencing the perceived value relevance of fair value estimates of financial instruments have been researched in connection with the outburst of the financial crisis. However, we acknowledge that some of these factors might have implications for value relevance through their impact on the perceived reliability. One of the factors studied has been the inputs used to estimate fair values (Kolev, 2009; Goh et al., 2009; and Song et al., 2010). These studies analyze the decision usefulness of banks' fair value assets and liabilities across the different fair value inputs during the financial crisis in 2008. All three studies find that all fair values irrespective of the inputs used to estimate them are positively associated with the stock price of a company; fair values using not only level 1 and level 2 inputs, but also level 3 inputs are considered sufficiently reliable and relevant to equity investors. Even though all of them are relevant, the degree of relevance varies – it decreases when fair values are based on inputs from a lower level of the input hierarchy. The pricing of mark-to-model estimates (level 3) is generally lower than the pricing of fair values based on unadjusted market prices (level 1).

For example, Goh et al. (2009), estimate that investors value every $1 of level 1 net fair value assets and level 3 net assets disclosed on the balance sheet of a financial institution at $ 0.849 and $ 0.486 respectively. Kolev (2009), Song et al. (2010), and Bosch (2012) obtain similar results. A summary of their empirical results is outlined in the Table below. Although Goh et al. (2009) find a statistically significant difference between the pricing of the fair value estimates on the balance sheets of companies based on inputs of level 1 and level 2; the other three studies do not find such a difference.

Table 1: Summary of some previous research results

	FVA1/NFVA1	FVA2/NFVA2	FVA3/NFVA3	Data
Goh et al. (2009)	0.849	0.626	0.486	US
Kolev (2009)	0.745	0.740	0.624	US
Song et al. (2010)	0.968	0.972	0.683	US
Bosch (2012)	0.687	0.690	0.321	European

In addition to variation in the relevance of fair values based on different inputs, previous research find that the relevance of fair values can be dependent upon certain company characteristics. Kolev (2009) tests and confirms that investors treat mark-to-model (level 3) estimates as more

value-relevant when firms have higher level of equity capital, the Audit Committee has more than one financial expert, and estimates are obtained from outside third parties. Goh et al. (2009) find a positive relationship between capital adequacy and audit quality on the one hand, and the pricing not only of Level 3 but also of Level 2 fair values. However, a similar study by Bosch (2012) shows that the regulatory capital ratio has no significant influence on the reliability and the value relevance of level 3 fair values. Song et al. (2010) find additional factors related with differences in the value relevance of fair values estimated using Level 2 and level 3 inputs. Those factors are mainly related to governance mechanisms such as board independence, audit committee financial expertise, the frequency of annual audit committee meetings, and the auditor's office size. Overall, the results presented by Song et al. (2010) highlight the importance of corporate governance mechanisms in mitigating the information asymmetry problem associated with Level 2 and Level 3 inputs.

3.3.2. Limitations

In short, the variation of results and the lack of strong evidence supporting them is a reason why we believe that further research in the field is necessary.

Several reasons for the variation in results could be easily pinpointed. Firstly, the three studies done on US data base their findings on a sample of financial information obtained from financial reports only during 2008. Kolev (2009) uses data from first and second quarter of 2008, Goh et al. (2009) use data from the first 9 months of 2008, while Song et al (2010) use data from the first three quarters of 2008. Since the periods observed are short, any small variation in the sample has a significant impact over the results and subsequent conclusions made. Samples over an extended time period to test the value relevance of accounting fair values have been rarely used, and based mainly on hand-collected European data (e.g., Bosch, 2012, who use European data from 2006 to 2010). In order to increase the reliability of a study of such nature, we use an extended sample with a much greater number of observations.

Secondly, the financial institutions included in the sample of the studies vary. Song et al. (2010) use the banking industry, Kolev (2009) focuses on large financial firms, while Goh et al. (2009) uses data from both depository institutions and non-depository credit institutions. The variation in the results together with the variation in the samples implies that the nature of the financial institution might have implications for the relevance of the different fair value inputs. Acknowledging this variation, we examine the nature of the financial institutions as an additional control variable for understanding the relationship between stock prices and fair values.

A third issue of concern which might have impacted previous results adversely is the method used to test the defined hypotheses. For example, Goh et al. (2009) and Bosch (2012) run Ordinary Least Square (OLS) Regressions without taking the distribution of the data used into consideration. A normal distribution is one of the prerequisites to obtain reliable results from an OLS regression (Gujarati, 2004). Our tests of the distribution of similar data show that it is far from normally distributed. This is a strong piece of evidence putting under question the robustness of the tests and results provided by Goh et al. (2009). Different approaches could be used to handle the lack of normality and we discuss one of them in the Results Section of this paper.

Furthermore, Goh et al. (2009) tries to explore the development in the relevance of the fair value estimates, and argues that the pricing of Level 2 and Level 3 assets declines over the course of 2008, consistent with increasing market concerns about illiquidity and information risk associated with these types of assets. A similar method is used by Kolev (2009). However, their results are generated by running identical regressions on different samples, followed by comparisons between them, a method which is not statistically recommendable (Hardy, 1993). More accurate statistical approaches could be used for this purpose and one of them has been discussed in the Research Design section of our paper. Moreover, Goh et al. (2009) make a comparison over time, but only for 2008. We believe, in line with Kohlbeck (2008), that the evolution of capital markets, the change in regulatory environment, and the increasing focus on fair value estimates after 2008 have likely affected investors' view on fair values over the years Therefore, a research on the changes in the relevance over the years could provide further insights about the relationship between the fair value relevance and different economic conditions.

To summarize, drawing conclusions from studies based on data obtained during a global financial crisis might be dangerous, since the role of fair value accounting can differ in different settings. Pinnuck (2012), finds that the role of fair value accounting in the conditions of a global financial crisis can differ from the one in normal conditions, especially if: (i) the market prices that are used to mark-to-market are less likely to reflect fundamentals; or (ii) the incentives of preparers using fair value accounting differed in the global financial crisis from those present in normal conditions. Hence, trusting the research on the relevance of the fair value accounting done only in conditions of crisis might be misleading or not sufficient to uncover significant trends, fair value properties and relevance drivers. We therefore believe that a study based on an extended data sample from times of various macroeconomic conditions is necessary.

4. Hypothesis development

4.1. The basic Ohlson model

Academic research uses various valuation models to structure tests assessing how well certain accounting amounts reflect information used by investors in their decision making process. A widely used model is the one developed by Ohlson (1995). Ohlson's model expresses the market value of a firm's equity as a function of its earnings and the book value of equity (Ohlson, 1995). The model relies on the clean surplus relationship, which means that the change in the book values of a company equal its earnings minus dividends (net of capital contributions). Based on that, Ohlson (2005) expresses dividends in terms of accounting earnings and book values.

The second significant assertion which Ohlson (1995) utilizes is that equity value equals the present value of a company's expected dividends (Discounted Dividend Model). Based on those two assumptions, Ohlson (1995) develops a framework for estimating a firm's equity value based on its accounting earnings and book values. Specifically, the core of the valuation function expresses value as a weighted average of capitalized current earnings (adjusted for dividends) and current book value. The model synthesizes previous research by combining a pure cash flow valuation with the bottom-line items in a company's financial reports through the clean surplus relationship to estimate market value of equity. [2]

Although the model mainly expresses the market value of a firm's equity as a function of its earnings and the book value of equity, Ohlson also includes a "other information" variable which should express facts known to the market at time t and not (yet) incorporated into the accounting system, but nonetheless able to affect future earnings. However, researchers have faced difficulties in identifying this variable. Silvestri et al. (2012) points out a few proxies of this variable considered by previous researchers: information asymmetry (Hand et al, 1999), taxes (Collins et al., 2000), firm-specific risk (Gebhardt et al., 2001), and the linearity of the function (Yee, 2000). Nevertheless, Giner et al. (2006) show that the original version of the model explains share prices more accurately than more complex models. A number of previous studies have successfully tested the relevance of the model in its basic form in US, Europe and Asia (Collins et al., 1997, Francis et al., 1999, Valdes et al., 2010, Dahmash et al., 2012). However, it has not been tested in modern conditions. Hence, we take the basic form of the Ohlson model as a starting

[2] The model makes the assumption of efficient markets as well. Such an assumption might be optimistic, especially in times of crisis. Changing economic conditions drive fluctuations in overall price levels. That is a limitation faced by many value relevance studies.

point for our analysis and a tool for testing our remaining hypotheses, but we start by investigating its adequacy with regards to recent US data. Thus, our first hypothesis is as follows:

H1a: The basic form of the Ohlson model is applicable for US financial institutions in modern conditions (2003-2012).

Secondly, in light of the current dynamic economic conditions and the development of the reporting requirements and regulations for the financial industry in recent years, we expect the relevance of accounting information for financial institutions in the US to have been affected as well. One reason for a change in the relevance of accounting information could also have been the introduction of new accounting standards and more precisely SFAS 157 in late 2006 (mandatory from November 15, 2007), and its amendments in the following years. Since SFAS 157 affects the accounting for approximately 20% of the balance sheet of financial institutions[3], it is reasonable to expect some impact over the relevance of reporting information. Thus, our second hypothesis is as follows:

H1b: The relevance of accounting information for financial institutions for the period 2008 – 2012 has improved in comparison to the period 2003 - 2007.

4.2. The Fair Value hierarchy

As companies did not report in accordance with the fair value hierarchy before 2007, the following hypotheses, many of them testing the relevance of different fair value levels, will be conducted on data from 2007 onwards.

Previous research implies that financial statement users perceive the reliability of fair value estimates to be decreasing with an increase in the management opportunity to bias the reported values (Barth, 1994; Danbolt et al., 2008; Kolev, 2009). The reporting requirements of SFAS 157 and its amendments give us the chance to test this notion by comparing the value relevance of fair values estimated using different degrees of management discretion. The lack of actual market prices for certain assets and liabilities which should be measured at fair value necessitate the use of internally generated estimates, referred to as mark-to-model or Level 3 inputs. This creates space for intentional bias (Martin et al. 2006; Kolev, 2009). Market prices used in fair value estimates, however, are more easily verifiable and should therefore decrease the opportunity for managerial bias, thus making those values more relevant. Thus, our main hypothesis:

[3] Estimated as (Fair Value Assets + Fair Value Liabilities)/(Total Assets + Total Liabilities) for our sample.

H2a: The relevance of fair value information for financial instruments of financial institutions decreases with the increase of management discretion allowed in the fair value estimates.

After the initial introduction of SFAS 157, however, a number of updates and amendments have been implemented. Most significant among them, and already discussed have been FSP FAS 157-3 (October, 2008) and FSP FAS 157-4 (April, 2009). These amendments have improved the guidelines with regards to fair value accounting. Thus, we expect the relevance of fair value estimates to have changed as a result of those improvements in the accounting standards. Thus, our next hypothesis is:

H2b: The relevance of the fair value estimates using all three levels of inputs has improved since the introduction of the fair value hierarchy.

4.3. Additional characteristics

As already discussed, the original Ohlson model (2005) expresses the market value of a firm's equity primarily as a function of its earnings and the book value of equity. However, the model also includes an "other information" variable. Even though there have been difficulties in identifying that additional variable, following the steps of previous researchers we also consider a few variables as a way to improve even further the accuracy of our results. Thus, we test if the relevance of the fair value estimates is correlated with given company features.[4] We add a number of control variables to gain further insight into the relevance of the fair value estimates depending on the company. Undoubtedly, the risk characteristics of a company have an impact over its stock price. Thus, considering risk as a control variable might improve our understanding of the relevance of fair value estimates. A few proxies of risk will be tested.

The first proxy for risk which we test is size. Previous research (Fama-French, 1993) has shown that the size of a company matters for its stock returns, as the stocks of smaller companies yield higher returns as a compensation for risk. In addition, Barth (1994) argues that larger banks are likely to have more precise fair value estimates due to market power and sophistication of their investment departments. Thus, we test if size matters for the relevance of fair value estimates:

H3a: The relevance of fair value estimates increases with an increase in the size of a company.

[4] Indeed in 2001, Ohlson expressed an opinion that the "mysterious" variable can be approximated with predictions of future earnings made by financial analysts. However predictions about future earnings of a company vary considerably depending on the source of information, and obtaining reliable earnings estimates is not an easy task. Adding an average of the earnings forecasts for financial institutions available from Compustat did not improve our models. That is why we have chosen not to include the results from those tests in our paper. Instead, following other researchers, we consider other variables as an approximation of the additional information not captured in the book value of equity and the earnings of a company.

The second proxy of risk tested is the capital ratio. The recent financial crisis and failure of financial institutions have brought attention to the capital availability as an indicator of a company's health and long-term viability. As the incentives to misreport are higher for financial firms with low levels of capital (Moyer, 1990), it is likely that investors would put less trust in fair value estimates of companies with low capital ratios. Similar tests have been done by Goh et al. (2009), however on a sample with limitations both in terms of size and time, and by Bosch (2012), conducting his study on a European data sample.

H3b: The relevance of fair value estimates is lower for companies with lower capital ratio.

The third proxy of risk we test is the credit rating. It is an evaluation of a company's ability to pay back its debt and its probability of default. As the probability of default for a company gets higher, the market pricing of its net assets is expected to get lower. This means that the market price corresponding to the net fair value assets of a company with a low credit rating should be lower compared to a company with a high credit rating. Thus we add the credit rating as a control variable when evaluating the relevance of book fair values. Similar tests have been done by Kolev (2009), however with previously mentioned sample restrictions.

H3c: The relevance of fair value estimates is lower for companies with lower credit rating.

Finally, as a rather arbitrary proxy of risk we consider the nature of the financial institutions researched. In other words, investors might value differently information provided by depository institutions and by non-depository credit institutions due to the different natures of their underlying business. Allen et al. (2004) argue that depository institutions are exposed to higher operational risk levels in comparison to non-depository institutions. The latter, in turn, are exposed to more market risk, credit risk and other risk events. Furthermore, Allen et al. (2004) argue that losses due to operational risk events are smaller, on average, than the losses arising from a combination of market risk, credit risk or other risk events. Hence, changes in market conditions are more likely to have a more profound impact over the financial performance and viability of non-depository institutions rather than depository ones. Therefore, one could argue that the higher risk exposure of depository institutions might result in lower value attributed by investors to their net assets. Hence, our next hypothesis is:

H3d: The relevance of fair value estimates is different for banks and for credit institutions.

5. Research design

5.1. The basic Ohlson model

Hypothesis 1a: The Ohlson model (1995) is one of the most discussed models in recent market-based accounting research since it synthesizes previous research and expresses the market value of a firm's equity as a function of its earnings and the book value of equity. The basic specification of the model used by previous researchers (e.g. Collins et al., 1997[5]) is:

$$MVE_{i,t} = \alpha_0 + \alpha_1 E_{i,t} + \alpha_2 TBVEQ_{i,t} + \varepsilon_{i,t}$$

Where

- $MVE_{i,t}$ is the market value of a firm i's equity three months after fiscal year t,
- $E_{i,t}$ is the earnings of firm i during the period ending at date t,
- $TBVEQ_{i,t}$ is the total book value of equity of firm i at date t,
- $\varepsilon_{i,t}$ is the other value-relevant information for firm i for the period ending at date t,
- α_0 the intercept captures systematic effects of the market value variation, not explained by the remaining variables on the right hand side of the equation.

In order to mitigate incorrect inferences due to size differences among companies, the data used in our research is taken into consideration 'per share' (i.e., divided by the number of outstanding shares), following a technique called scaling. Silvestri et al. (2012) points out that this technique, used by other researchers as well, minimizes distortions in the coefficients and hence avoids misleading results when running regressions.

Since we plan to use quarterly reports, our market value information is based on stock exchange information from the business day after the reporting date. Considering the high volatility of stock prices we believe that the shorter the time span between the reporting date and the date of the stock prices is, the better the relationship between both could be captured. This would reduce the additional uncertainty in our tests stemming from the often daily volatility of market prices.

As a measure of market value we use the daily closing price reported for the company on the stock exchange. The book value of equity per share is calculated in the following way:

[5] The main difference between the model used by Collins et al. (1997) and the original Ohlson model is the use of Earnings instead of Abnormal earnings (Ohlson's model includes a term $(1 + r_{it})/r_{it}$ for discounting the earnings of each company). However, Maydew(1993) finds that allowing discount rates to vary across firms does not significantly improve the explanatory power of the model, which is why we do not include them in our analysis.

BVEQ = (Total Assets – Total liabilities – Preference Stock) / Common Shares outstanding

In order to attain as relevant information as possible, we use Net Income rather than Other Comprehensive income as a measure of earnings, as Lin (2007) proves that Net Income provides more value relevant information. Furthermore, Elliott et al. (1996) demonstrate that the market places less weight on special items than on earnings before special items. This is consistent with the notion that special items represent 'low quality' or transitory income items. Thus, we use earnings before extraordinary items as those are likely to be less transitory and more stable over time.

Therefore, the specification of our *Hypothesis 1a* is as follows:

$$P_{i,t} = \alpha_0 + \alpha_1 EPS_{i,t} + \alpha_2 BVEQ_{i,t} + \varepsilon_{i,t} \quad (1a)$$

Where

- $P_{i,t}$ is the price of a firm i's share on the date after the reporting of quarterly results for the quarter ending at date t,
- $EPS_{i,t}$ is the earnings per share of a firm i during the quarter ending at date t,
- $BVEQ_{i,t}$ is the book value of equity per share of a firm i at date t,
- $\varepsilon_{i,t}$ is the other value-relevant information for firm i for the quarter ending at date t,
- α_0 captures systematic effects of the share price variation, not explained by the remaining variables on the right hand side of the equation.

We expect to observe a positive relationship between market value, on the one hand, and book value and earnings, on the other hand.

Hypothesis 1b: In order to test if the relevance of accounting information for financial institutions has improved since 2008, we introduce a dummy variable.

$$D = \begin{pmatrix} 0\ if\ quarterly\ report\ has\ been\ published\ before\ 1\ January\ 2008 \\ 1\ if\ quarterly\ report\ has\ been\ published\ after\ 1\ January\ 2008 \end{pmatrix}$$

We include the dummy variable in the Ohlson model to test the change in the relevance of the earnings, as well as the change in the relevance of the book value of equity. Adding the dummy variable for the intercept as well will allow us to capture change in the systematic share price variation not explained by the remaining variables on the right hand side of the equation.

$$P_{i,t} = \alpha_0 + \alpha_1 D + \alpha_2 EPS_{i,t} + \alpha_3 EPS_{i,t} D + \alpha_4 BVEQ_{i,t} + \alpha_5 BVEQ_{i,t} D + \varepsilon_{i,t} \quad (1b)$$

The coefficient of $EPS_{i,t}D$ indicates the change in the relevance of EPS during the second period in comparison to the first one, while the coefficient of $BVEQ_{i,t}D$ shows the corresponding change for BVEQ.

5.2. The Fair Value hierarchy

Hypothesis 2a: The introduction of SFAS 157 in late 2006 gives us the chance to compare the relevance of accounting book values estimated using different degrees of management discretion. In order to test this, we merely extend the Ohlson model. Since the book value of a company's equity is basically the book value of its net assets, we split the net assets into net fair value assets and net non-fair value assets. We choose to investigate net fair value assets instead of assets and liabilities separately, because many financial institutions carry no or very small amounts of fair value liabilities, thus limiting its importance. Furthermore, the disclosure requirements of SFAS 157 provide information on the inputs used to estimate fair values. Thus, net fair value assets could be further divided into net fair value assets using inputs of level 1, level 2 and of level 3.

$$P_{i,t} = \alpha_0 + \alpha_1 EPS_{i,t} + \alpha_2 NNFVA_{i,t} + \alpha_3 NFVA1_{i,t} + \alpha_4 NFVA2_{i,t} + \alpha_5 NFVA3_{i,t} + \varepsilon_{i,t} \quad (2a)$$

- $P_{i,t}$ is the price of a firm i's equity on the date after the reporting of quarterly results for the quarter ending at date t,
- $EPS_{i,t}$ is the earnings per share of a firm i during the quarter ending at date t,
- $NNFVA_{i,t}$ is net non-fair value assets per share of a firm i at date t, $NNFVA_{i,t} = BVEQ_{i,t} - NFVA_{i,t}$, where net fair value assets per share is the difference between fair value assets and fair value liabilities, divided by the number of common outstanding shares,
- $NFVA1_{i,t}$ is net fair value assets per share estimated using level 1 inputs of a firm i at date t, calculated as assets using level 1 inputs minus liabilities using level 1 inputs,
- $NFVA2_{i,t}$ is net fair value assets per share estimated using level 2 inputs of a firm i at date t, calculated as assets using level 2 inputs minus liabilities using level 2 inputs,
- $NFVA3_{i,t}$ is net fair value assets per share estimated using level 3 inputs of a firm i at date t, calculated as assets using level 3 inputs minus liabilities using level 1 inputs,
- $\varepsilon_{i,t}$ is the other value-relevant information for firm i for the period ending at date t,
- α_0 captures systematic effects of the share price variation, not explained by the remaining variables on the right hand side of the equation.

Hypothesis 2b: However, since we expect the relevance of accounting information to have changed over time, we proceed by constructing dummy variables to detect changes between years for the period 2008-2012:

- $D_1 = 1\ for\ observations\ where\ the\ quarterly\ reports\ refer\ to\ 2009$; $D_1 = 0$ otherwise
- $D_2 = 1\ for\ observations\ where\ the\ quarterly\ reports\ refer\ to\ 2010$; $D_2 = 0$ otherwise
- $D_3 = 1\ for\ observations\ where\ the\ quarterly\ reports\ refer\ to\ 2011$; $D_3 = 0$ otherwise
- $D_4 = 1\ for\ observations\ where\ the\ quarterly\ reports\ refer\ to\ 2012$; $D_4 = 0$ otherwise

Testing each of the variables in equation (2a) together with a dummy for a certain year will show if there has been a change in the relevance of book values and/or earnings relative to 2008.

$$P_{i,t} = \alpha_0 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 +$$

$$+\alpha_{10} EPS_{i,t} + \alpha_{11} EPS_{i,t} D_1 + \alpha_{12} EPS_{i,t} D_2 + \alpha_{13} EPS_{i,t} D_3 + \alpha_{14} EPS_{i,t} D_4 +$$

$$\alpha_{20} NNFVA_{i,t} + \alpha_{21} NNFVA_{i,t} D_1 + \alpha_{22} NNFVA_{i,t} D_2 + \alpha_{23} NNFVA_{i,t} D_3 + \alpha_{24} NNFVA_{i,t} D_4$$

$$\alpha_{30} NFVA1_{i,t} + \alpha_{31} NFVA1_{i,t} D_1 + \alpha_{32} NFVA1_{i,t} D_2 + \alpha_{33} NFVA1_{i,t} D_3 + \alpha_{34} NFVA1_{i,t} D_4 +$$

$$\alpha_{40} NFVA2_{i,t} + \alpha_{41} NFVA2_{i,t} D_1 + \alpha_{42} NFVA2_{i,t} D_2 + \alpha_{43} NFVA2_{i,t} D_3 + \alpha_{44} NFVA2_{i,t} D_4 +$$

$$\alpha_{50} NFVA3_{i,t} + \alpha_{51} NFVA3_{i,t} D_1 + \alpha_{52} NFVA3_{i,t} D_2 + \alpha_{53} NFVA3_{i,t} D_3 + \alpha_{54} NFVA3_{i,t} D_4 +$$

$$+\varepsilon_{i,t} \quad (2b)$$

The coefficient of the variables multiplied by a dummy indicates the change in the relevance of that variable in comparison to the first year (2008), while the variables without a dummy show the relevance for the starting period - 2008. For example, the coefficient of $EPS_{i,t} D_3$ shows the change in the relevance of the EPS in year 2011 in comparison to 2008.

5.3. Additional characteristics

Hypothesis 3: Next, we test if the variations in the relevance of financial institutions' fair value estimates are correlated with given company characteristics. In order to do that, we add those characteristics as control variables in our extended version of the Ohlson model (equation 2a).

a) As a proxy of size we use the market capitalization of each company at the end of the quarter. Similar tests have been done by Goh et al. (2009). We add a dummy variable for size:

$$D = \begin{pmatrix} 0\ if\ the\ size\ is\ below\ the\ median\ for\ our\ sample \\ 1\ if\ the\ size\ is\ above\ the\ median\ for\ our\ sample \end{pmatrix}$$

$$P_{it} = \alpha_0 + \alpha_{11}EPS_{i,t} + \alpha_{12}NNFVA_{i,t} + \alpha_{13}NFVA1_{i,t} + \alpha_{14}NFVA2_{i,t} + \alpha_{15}NFVA3_{i,t} +$$

$$\alpha_{20}D + \alpha_{21}EPS_{i,t}D + \alpha_{22}NNFVA_{i,t}D + \alpha_{23}NFVA1_{i,t}D + \alpha_{24}NFVA2_{i,t}D +$$
$$\alpha_{25}NFVA3_{i,t}D + \varepsilon_{i,t} \quad (3a)$$

where for example $(\alpha_{11} + \alpha_{21})$ represents the relevance of EPS for big companies.

b) In order to test the relevance of the capital ratio we also add a dummy variable:

$$D = \begin{pmatrix} 0\ if\ the\ capital\ ratio\ is\ lower\ than\ the\ median\ for\ our\ sample \\ 1\ if\ the\ capital\ ratio\ is\ higher\ than\ the\ median\ for\ our\ sample \end{pmatrix}$$

And we test the hypothesis with the following regression specification:

$$P_{it} = \alpha_0 + \alpha_{11}EPS_{i,t} + \alpha_{12}NNFVA_{i,t} + \alpha_{13}NFVA1_{i,t} + \alpha_{14}NFVA2_{i,t} + \alpha_{15}NFVA3_{i,t} +$$

$$\alpha_{20}D + \alpha_{21}EPS_{i,t}D + \alpha_{22}NNFVA_{i,t}D + \alpha_{23}NFVA1_{i,t}D + \alpha_{24}NFVA2_{i,t}D +$$
$$\alpha_{25}NFVA3_{i,t}D + \varepsilon_{i,t} \quad (3b)$$

where for example $(\alpha_{13} + \alpha_{23})$ represents the relevance of NFVA1 for companies with high capital ratio.

c) In order to test the relevance of a company's credit rating we also add a dummy variable:

$$D = \begin{pmatrix} 0\ if\ the\ capital\ ratio\ is\ B-, C, or\ D \\ 1\ if\ the\ capital\ ratio\ is\ A+, A, A-, B+, or\ B \end{pmatrix}$$

And we test the hypothesis with the following regression specification:

$$P_{it} = \alpha_0 + \alpha_{11}EPS_{i,t} + \alpha_{12}NNFVA_{i,t} + \alpha_{13}NFVA1_{i,t} + \alpha_{14}NFVA2_{i,t} + \alpha_{15}NFVA3_{i,t} +$$

$$\alpha_{20}D + \alpha_{21}EPS_{i,t}D + \alpha_{22}NNFVA_{i,t}D + \alpha_{23}NFVA1_{i,t}D + \alpha_{24}NFVA2_{i,t}D +$$
$$\alpha_{25}NFVA3_{i,t}D + \varepsilon_{i,t} \quad (3c)$$

Where for example $(\alpha_{14} + \alpha_{24})$ represents the relevance of NFVA2 for companies with high credit rating.

d) To test if investors perceive the type of financial institution as a factor with an impact over the relevance of fair value estimates, we split the sample into depository and non-depository credit institutions. The factor used to distinguish between both is the Standard Industry Classification code (SIC). The financial institutions with a SIC code of 60 are defined as depository institutions, such as banks, while the financial institutions with a SIC code of 61 are defined as non-depository institutions, such as mortgage brokers. To control for the type of financial institution, we add a dummy variable in our regression.

$$D = \begin{pmatrix} 0 \; if \; the \; SIC \; is \; between \; 6100 - 6199 \\ 1 \; if \; the \; SIC \; is \; between \; 6000 - 6099 \end{pmatrix}$$

And we test the hypothesis with the following regression specification:

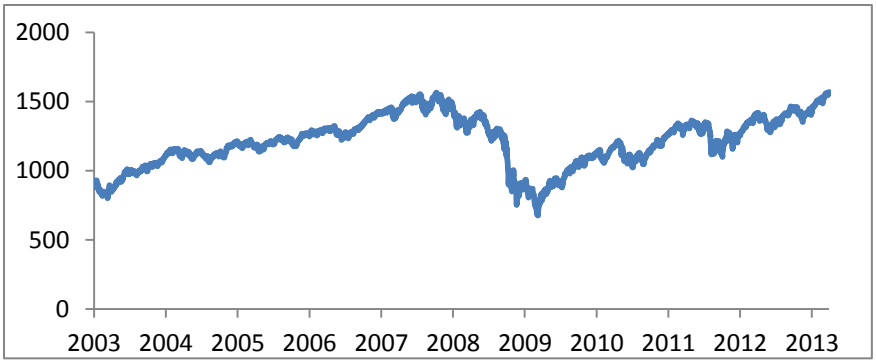
$$P_{it} = \alpha_0 + \alpha_{11}EPS_{i,t} + \alpha_{12}NNFVA_{i,t} + \alpha_{13}NFVA1_{i,t} + \alpha_{14}NFVA2_{i,t} + \alpha_{15}NFVA3_{i,t} +$$

$$\alpha_{20}D + \alpha_{21}EPS_{i,t}D + \alpha_{22}NNFVA_{i,t}D + \alpha_{23}NFVA1_{i,t}D + \alpha_{24}NFVA2_{i,t}D +$$
$$\alpha_{25}NFVA3_{i,t}D + \varepsilon_{i,t} \; (3d)$$

5.4. Robustness analysis

Finally, in order to ensure the robustness of our findings, we examine if changes in market prices are associated with changes in accounting book values. As evident from *Figure 3: S&P index* presented below, market prices have fluctuated considerably within the time period we have chosen to investigate.

Figure 3: S&P index



Source: Datastream

By investigating the relationship between the movements in the dependent variable, (Price), and the independent variables, we aim to check whether certain omitted variables are distorting our results, thus affecting the reliability of our results. The specifications of the tests are presented below:

$$\partial P_{i,t} = \alpha_0 + \alpha_2 \partial EPS_{i,t} + \partial BVEQ_{it} + \varepsilon_{i,t} \quad (4a)$$

$$\partial P_{it} = \alpha_0 + \alpha_1 \partial EPS_{i,t} + \alpha_2 \partial NNFVA_{i,t} + \alpha_3 \partial NFVA1_{i,t} + \alpha_4 \partial NFVA2_{i,t} + \alpha_5 \partial NFVA3_{i,t} + \varepsilon_{i,t} \quad (4b)$$

Where

- $\partial P_{i,t}$ is the change in share price of company i between t and t-1
- $\partial EPS_{i,t}$ is the change in earnings per share of company i between t and t-1
- $\partial BVEQ_{i,t}$ is the change in book value of equity per share of company i between t and t-1
- $\partial NNFVA_{i,t}$ is the change in non net fair value assets per share of company i between t and t-1
- $\partial NFVA1_{i,t}$ is the change net fair value assets level 1 per share of company i between t and t-1
- $\partial NFVA2_{i,t}$ is the change in net fair value assets level 2 per share of company i between t and t-1
- $\partial NFVA3_{i,t}$ is the change in net fair value assets level 3 per share of company i between t and t-1

All the changes are calculated by subtracting the numbers from previous quarters from the numbers from the current quarter.

6. Sample selection and descriptive statistics

6.1. Sample selection

To minimize data collection costs while maximizing the power of the tests, we obtain balance sheet information from Compustat North America Fundamentals Quarterly, updated monthly. We focus on a set of financial institutions due to their balance sheet composition, where financial assets and liabilities measured at fair value often are a substantial part of the balance sheet. In order to identify the sample, we start with all companies with a Standard Industry Classification Code of 60 or 61, which includes depository institutions and non-depository credit institutions. Quarterly Balance Sheet information has been obtained for the time period between January 1, 2003 and December 31, 2012, including quarterly reports for periods ending before December 31, 2012, even if reported after that date. This procedure resulted in 38 189 observations. Thereafter, we removed observations with no quarterly reporting dates available from Compustat (3674 observations), since the lack of reporting date raises confusion about which dates of market information that should be collected for those observations. The sample includes every financial institution fulfilling the data requirements, regardless of whether they have been active throughout the whole period of the study or just a part of it.

Market information was obtained from Compustat North America Security Daily, updated monthly. Stock prices for the business day immediately after the reporting date are used. If no stock price information was available from Compustat within three days after the release of quarterly reports, the observations were excluded from our sample in order to minimize the risk of data errors or biased observations[6].

Since Compustat provides market information for different issues of companies' stock, and the pricing of the different issues is not necessarily the same, we chose to use the prices of the shares from the first issue for each company (Issue ID of 01 according to the Compustat Codification system) since subsequent issues of common stock might be initially underpriced (McDonald, 1972). That resulted in a sample of 29 351 observations for 1196 unique companies that have released quarterly reports at least once during the chosen time period. Furthermore, only stocks traded in the US were kept in the sample - resulting in an elimination of an additional 274 observations, and a final sample with data for 1178 unique financial institutions.

[6] The introduction of the new standards does not seem to delay the preparation of financial reports, the average time span between the end of the reporting period and the release of financial reports appear unchanged before and after 2008 (approximately 30 days).

6.1.1. Overall Sample

For the tests of our first set of hypotheses, we exclude observations with missing values for total assets, total liabilities, preference shares, earnings and common shares outstanding (551 observations). Furthermore, observations were identified for which prices of common stock have been filed in Compustat but the number of outstanding shares on the reporting date was reported as zero. This lack of data made scaling the balance sheet items per share impossible, and we thus decided to exclude those 12 observations.

Finally, in order to avoid errors in our regressions, we drop observations for which Compustat does not provide information regarding the variables that we pay attention to. In addition to eliminating observations due to missing data or data errors, three financial institutions, identified as extreme outliers, were ignored for our analyses due to their extreme and significant impact on both the descriptive statistics and the regression results. The process leading to our final sample is summarized in *Table A 1: Sample construction*.

The resulting sample used to test hypotheses 1 consisted of 28 356 observations for 1171 unique financial institutions. These companies had ordinary shares listed either on the New York Stock Exchange, the American Stock Exchange, the OTC Bulletin Board, the NASDAQ-NMS Stock Market, or on other-OTC exchanges.

In order to investigate whether or not the number of observations is evenly spread throughout the studied period, a table is presented outlining the number of observations during each year and quarter (*Table 2: Observations per year and quarter for testing Hypothesis 1*).

Table 2: Observations per year and quarter for testing Hypothesis 1

	Quarter				
Year	**1**	**2**	**3**	**4**	**Total**
2003	774	840	833	785	3 232
2004	823	816	801	780	3 220
2005	798	789	785	761	3 133
2006	745	762	757	736	3 000
2007	742	734	728	693	2 897
2008	714	708	704	659	2 785
2009	681	672	667	637	2 657
2010	668	658	654	649	2 629
2011	602	636	637	640	2 515
2012	633	630	590	435	2 288
Total	**7 180**	**7 245**	**7 156**	**6 775**	**28 356**

It can be inferred from the table that the number of observations decreases throughout the period. One likely explanation for that could be the severe impact of the financial crisis. It is furthermore worth mentioning that during the data collection point in time, some companies had not released their financial reports for the 4th quarter of 2012 yet. Nonetheless, we do not consider these fluctuations in the number of observations as a problem of great concern due to the significant size of the sample. However, it could very well affect the significance of year-to-year differences in some variables.

Table 3: Exchange listings over time for the period 2003-2012

	Stock exchange					
YR	**New York Stock Exchange**	**American Stock Exchange**	**OTC Bulletin Board**	**NASDAQ-NMS Stock Market**	**Other-OTC**	**Total**
2003	325	99	159	2 030	619	3 232
2004	327	84	157	2 002	650	3 220
2005	323	73	138	1 965	634	3 133
2006	307	64	125	1 881	623	3 000
2007	303	64	116	1 787	627	2 897
2008	289	62	111	1 737	586	2 785
2009	288	62	113	1 709	485	2 657
2010	282	59	135	1 723	430	2 629
2011	271	55	135	1 669	385	2 515
2012	270	47	114	1 568	289	2 288
Total	**2 985**	**669**	**1 303**	**18 071**	**5 328**	**28 356**
Percentage	10.53	2.36	4.60	63.73	18.79	100.00

In order to investigate the decline in observations over time, we also look at the exchange listing of our observations. Looking at *Table 3: Exchange Listing over time for the period 2003-2012,* presented above, we notice that a very large fraction (64 %) of our observations are companies listed on the NASDAQ, highlighting the large amount of small banks and depository institutions present throughout the U.S. Moreover, the tables above imply that the number of firms on all of the stock exchanges has decreased over the sample period. However, it is worth to acknowledge that the drop in firms listed on NYSE, amounting to 17%, is considerably less than the drop on the OTC exchanges, where the corresponding number amounts to 51 %. This difference indicates that the number of small companies has decreased significantly during the observed period between 2003 and 2012, while the firms listed on NYSE and NASDAQ to a greater degree have continued to exist.

6.1.2. Subsample

To test our second hypothesis, we use only a limited amount of the observations used for testing hypothesis 1. The reason for this change in sample size is mainly the shift in focus, as later regressions investigate the value relevance of certain financial information, available only from 2007 onwards. Thus, we retain only the observations with information provided on the different categories of fair values and only for the reduced time period between 2007 and 2012. It should be considered that such an elimination procedure could significantly change the characteristics of the sample. One reason why the financial information of interest is not provided in the financial reports of all financial institutions is that different regulatory requirements are applied to companies' financial reports depending on what stock exchange a company is listed on. Exchanges (such as NASDAQ and the NYSE) have specific quantitative and qualitative listing and maintenance standards, which are stringently monitored and enforced. Companies listed on an exchange have reporting obligations to the market, and an on-going regulatory relationship exists between the market and its listed companies. OTC quotation services (OTCBB, OTC Markets) facilitate quotation of unlisted securities. As such, any regulatory relationship between an OTC quotation service and the issuers may be relatively limited or non-existent (OTC Bulletin Board, 2007).

However, the reduction of the sample for our later regressions did not cause any substantial changes in the proportion of companies from different exchanges, as could be seen on *Table A 3: Exchange listings over time for the period 2003-2012* and *Table A 6: Exchange Listing over time for the observations included in the sample for tests of Hypothesis 2*. The elimination of observations not containing all the required data reduced the sample to 8 949 observations (summarized in *Table A 4: Sample construction for testing Hypotheses 2, 3 & 4*). The sample construction for the remaining hypotheses is also subject to slight variations, with the process again outlined in *Table A 4: Sample construction for testing Hypotheses 2, 3 & 4*.

In short, since our first and remaining hypotheses focus on different time periods and different financial information, two different samples are used. That is why we provide separate descriptive statistics and time series patterns for the variables of interest in each period (2003-2012 and 2007-2012).

6.2. Descriptive statistics

6.2.1. Overall sample

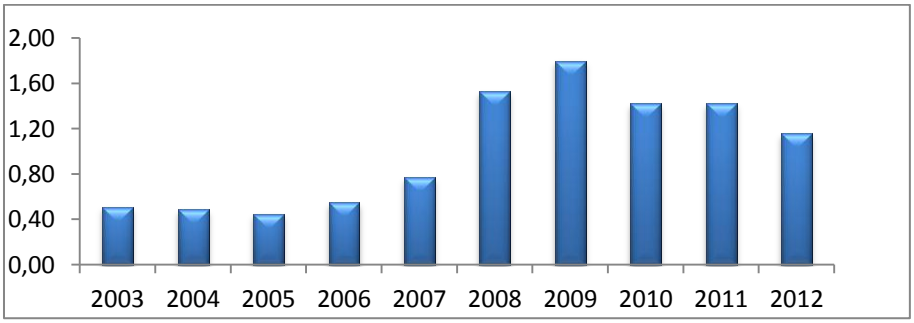
Table 3: Descriptive statistics for 2003-2012

Variable	Obs	Mean	S.D.	Min	0.25	Median	0.75	Max
Price	28356	20.97	32.31	0.00	9.45	16.20	25.50	1350.00
EPS	28356	0.25	1.54	-26.98	0.09	0.26	0.45	123.64
TA ps	28356	170.84	319.44	0.00	86.24	135.15	190.69	11961.36
TL ps	28356	155.26	296.82	-0.00	76.78	122.32	173.64	10637.16
BVEQ*	28356	15.11	24.94	-41.79	8.49	12.29	17.17	1324.20
BM	28356	0.97	3.46	-286.61	0.53	0.76	1.14	152.32
Cap. Ratio	21301	11.98	4.81	-13.48	9.62	11.30	13.48	191.83

Table 2: Descriptive statistics for 2003-2012, presents the descriptive statistics of the key variables used in our first set of regression analyses. The mean share price for the period is $20.97. The mean (median) Book Value of equity per share and EPS are $15.11 ($12.29), and $0.25 ($0.26). When looking at the Book-to-Market ratio, one can see that there is a large difference between mean (0.97), and median (0.76). This indicates the existence of observations with very high book-to-market ratios. These observations are a potential indicator of skewness in our data. However, it is discussed later on how we have chosen to handle this matter.

Table A 8: Time-series characteristics (means) for 2003-2012 presents key variables for our first data sample. The time series trends are generally in line with prior expectations. The EPS fluctuate quite significantly throughout the years. Notable declines are observed during the peak of the financial crisis in 2008 and 2009. However, the average EPS have recently been reverting to their pre-crisis levels. The turbulent economic environment during these years is also reflected in the Book-to-Market ratio, reaching a value of 1.80 in 2010 from 0.45 in 2005. The development of the Book-to-Market ratio over time reflects increased market concerns regarding the financial health of financial institutions. Furthermore, an upward trend has been observed in the capital ratio Tier1.

Figure 4: Book-to-market ratio over the years

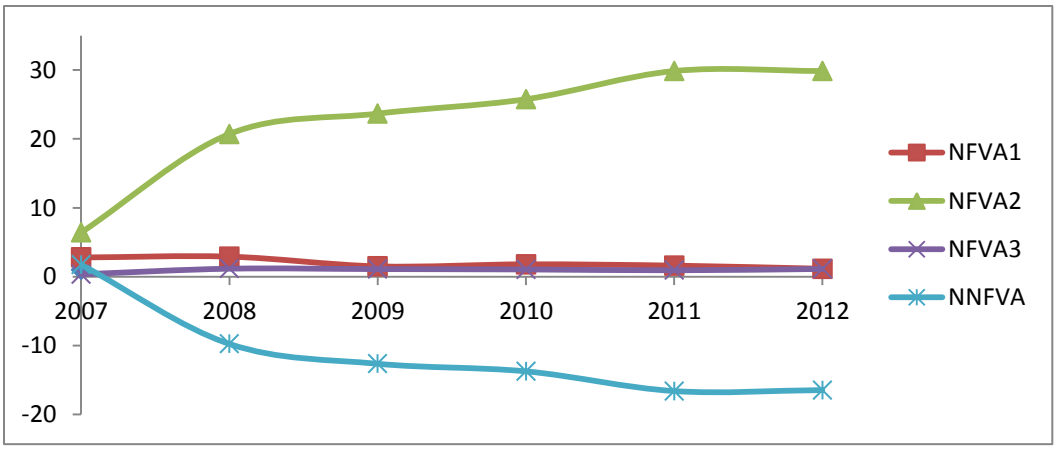


The Book Value of Equity, i.e. the Net Assets per share has been relatively constant over time, slightly increasing over the years except for 2009. One explanation for the fall in Book Value of Equity in 2009 could be the losses realized by financial institutions during the crisis in 2008. However, the average values of the variable revert to their trend after 2009.

6.2.1. Subsample

Table A 9: Descriptive statistics for 2007-2012 summarizes key characteristics of the data from our second sample. By comparing the two different samples, one can notice differences in the mean of certain characteristics. For example, EPS for the first sample is approximately 0.25, while for the second sample it is approximately 0.06. Furthermore, the BM ratio for the two samples is 0.97 and 1.52 respectively. Interpreting these changes, one could see that the market price and earnings are considerably lower for the second sample. These discrepancies in valuation and earnings are most likely a result of the changing economic conditions after 2007.

Figure 5: Trends in the amounts of Net Assets



Looking at the additional variables used in the later regressions, and more specifically the fair value assets and liabilities, some characteristics attract our attention. We observe mean net fair value assets estimated using inputs of level 1, level 2 and level 3 of $1.81, $25.75, and $1.07 respectively. Hence, the amount of level 2 net fair value assets is larger than the amount of level 1 net fair value assets. This shows that using solely market prices as a basis for estimating fair values has not been the most common practice. Observing the trends over time on *Figure 5: Trends in the amounts of Net Assets* (based on *Table A 10: Time-series characteristics (means) for 2007-2012*), we notice that the net assets measured at fair value by financial institutions have been increasing over the

years – from an average of 24.79 in 2008[7] to an average of 32.12 in 2012. However, the proportion of fair value assets from the total assets for the observed institutions has been just 15% on average. Nonetheless, since the proportion of the net fair value assets from the total net assets of the financial institutions has been 179% on average, studying the net fair value assets is of great interest. Hence, the net assets that the banks have marked at fair value appear to be significant in understanding the fundamental value of financial institutions' equity.

The negative values for the average net assets not at fair value indicate that financial institutions on average have more liabilities measured at non-fair value than assets at non fair value, thereby creating a mismatch between assets and liabilities measured at non-fair value. This mismatch is also an indication of a mismatch between the assets and liabilities measured at fair value.

Not surprisingly, in 2009, the mean market capitalization of the financial institutions declined to 1/4 of its pre-2007 levels. In addition, the mean capital tier-1 ratio for the period 2007-2012 is approximately 12%, higher than the 4 % minimum requirements stated in Basel II, implemented in the U.S from January 2009 (Council of Mortgage Lender, 2013). However, the required minimum tier-1 capital ratio minimum ratio was increased to 6 % with the implementation of Basel III (Basel Committee of Banking Supervision, 2011). Finally we notice that the majority of the observations in our sample are for companies with a credit rating of B.

Since we expect a difference between the financial institutions depending on their type, we have examined the difference in certain variables for both depository institutions and non-depository credit institutions (*Table A 11: Comparison of variables for Depository vs Non-depository Credit institutions*). Furthermore, examining *Table A 12: Comparison of variables for Depository vs Non-depository Credit institutions* , we notice that non-depository credit institutions on average have very low amounts of financial instruments valued as NFVA1, and instead have the highest proportion valued at NFVA3. This might indicate that non-depository credit institutions use inputs of Level 3 (i.e. management modeling) more often than depository institutions, or just an indication that management modeling is more common for credit institutions.

[7] We do not focus a lot on the figures provided for 2007 since our sample for that year is very restricted due to the fact that fair value disclosures concerning the different levels of inputs were not compulsory until November, 15, 2007.

Figure 6: Average amounts of Fair Values of Non-depository credit institutions and depository institutions

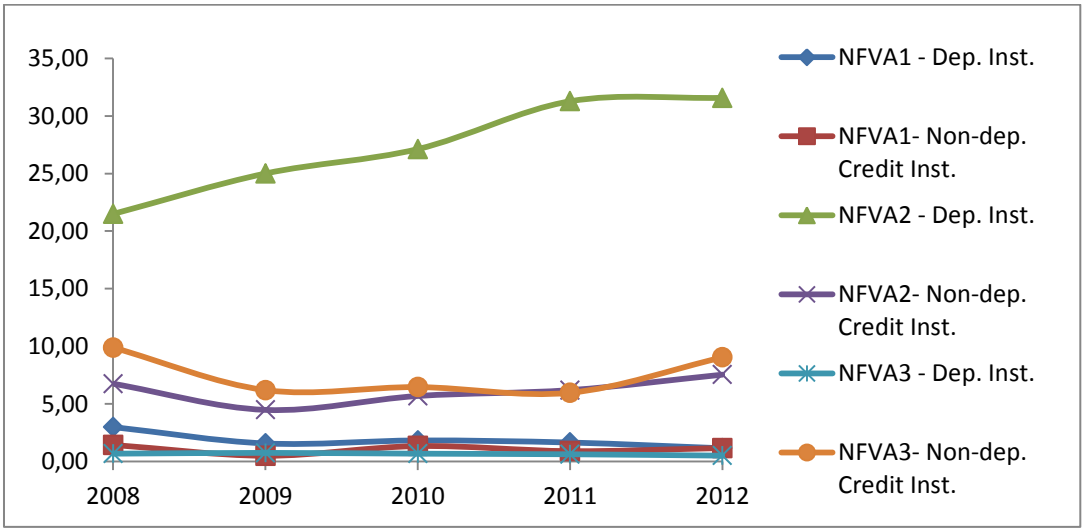


Table A 13: Correlation matrix for variables based on values for 2003-2012 and Table A 14: Correlation matrix for variables based on values for 2007-2012 present the Pearson and Spearman correlations among the variables for our analyses, for both of our samples. The correlation between price and NFVA3 is lower than the correlations between price, on the one hand, and NFVA1 and NFVA2, on the other hand. Specifically, price has Pearson (Spearman) correlations with NFVA1, NFVA2, and NFVA3 of 0.23 (0.19), 0.57 (0.38) and 0.05 (0.04), respectively. These correlations indicate that the market valuation of financial institutions has some but not extreme positive relationship with their amounts of net fair value assets. Meanwhile, the association appears to be weakest for NFVA3.

6.2.3. Econometric implications of the descriptive statistics

The descriptive statistics of our data provide evidence of a discrepancy between the mean and median values for many variables. This type of relationship between mean and median could be troublesome, as it might be an indication of skewness, meaning that the shape of the distribution is different from the one typical for normally distributed values of data. Additional tests provide information indicating that the skewness and the kurtosis of the values for many variables are indeed far from the ones typical for a normal distribution. However, using ordinary least square regressions might lead to inaccurate results in the lack of normal distribution (Gujarati, 2004). In order to mitigate the negative impacts of lack of normality, we use Iteratively Reweighted Least Squares regression (IRLS), a member of the robust-regression family. In contrast to the more common Ordinary Least Squares Regression (OLS), IRLS regression is insensitive to small deviations from the assumptions that the model imposes on the data in terms of distribution. IRLS is characterized by distributional insensitivity (Huber, 1981).

7. Results

7.1. The applicability of the Ohlson model

Hypothesis 1a: The results in *Table A 15: Relevance of earnings and net assets for the period 2003-2012* indicate that the basic form of the Ohlson model is applicable for US financial institutions in modern conditions (2003-2012), i.e. our first hypothesis is supported by the data. The model appears excellent for describing the relationship between market prices and accounting information provided in companies' financial reports (the adjusted R-squared is 94%). In addition, the coefficients for book value of equity per share (BVEQ), and earnings per share (EPS) are of the expected sign – the relationships between price and BVEQ, as well as between price and EPS, are positive. The coefficient for EPS (18.92) is higher than the one for BVEQ (0.65), indicating greater relevance of earnings than book values of equity from investors' point of view. These results are in line with the general belief that market prices are more strongly associated with a company's financial performance than with its balance sheet items. In short, we find evidence supporting the applicability of the Ohlson model for explaining the relationship between price, earnings, and book values in modern US conditions. Therefore, we will employ the model to test our remaining hypotheses.

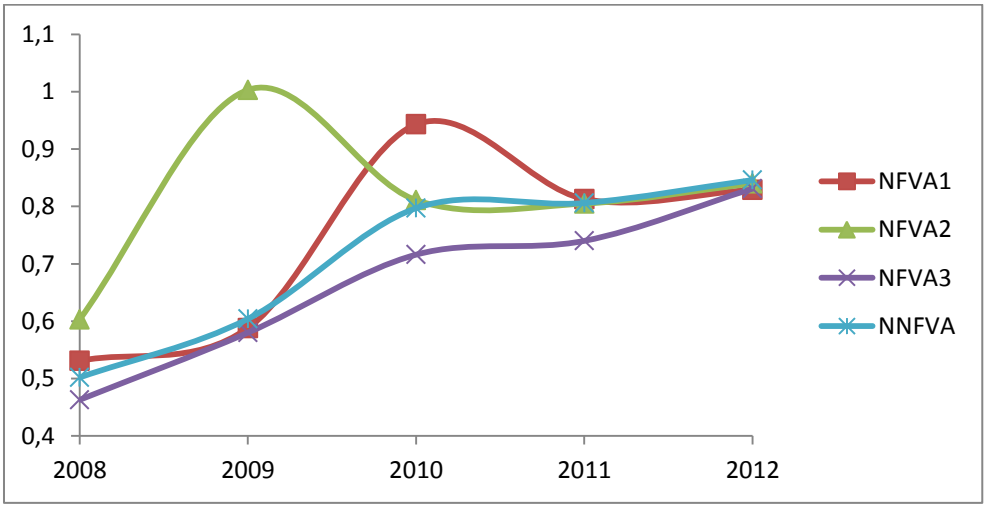
Hypothesis 1b: Evidence of a shift in the relevance of the accounting information before and after 2008 is presented in *Table A 16: Comparison of the relevance of earnings and net assets before and after 2008*. The relevance of EPS declines sharply from the period before 2008 to the period after 2008 - $1 of EPS corresponded to approximately $26.99 of share price in 2003 - 2007, before decreasing to $1.97 in the subsequent period from 2008 until 2012. In contrast, the relevance of book values of equity has increased from 0.593 to 0.829 per dollar of book value of equity disclosed on the balance sheet. Although one would intuitively expect the decreased value-relevance of EPS to be accompanied by a decrease in the value relevance of book value of equity, the empirical results are not such. In contrast, they imply a potential shift in the attention of investors. Information related to a company's financial performance is still perceived as more value-relevant than the information summarized in the balance sheet of a company. However, the importance attributed to the book value of equity has increased, while the importance attributed to the financial performance in terms of EPS has decreased. These changes cannot solely be attributed to changes in overall market price levels. The stock price movements during the periods 2003-2007 and 2008-2012 are reminiscent of each other, as both periods are characterized by similar fluctuations in market price levels (See *Figure 3: S&P index*). As a further measure to control for changing market prices, a robustness analysis was conducted. It established a relationship

between changes in market prices and changes in accounting book values. The results are presented in the end of this section. Hence, a reasonable explanation for the increased relevance of financial institutions' book values might be the implementation of new accounting standards providing more detailed and transparent disclosures on fair value positions.

7.2. The irrelevance of management discretion

Hypothesis 2a: Testing if the relevance of financial information for financial institutions is related to the extent of management discretion allowed when deriving it, provides results deemphasizing the significance of management discretion. We find that investors are rather unconcerned about the amount of management discretion employed in the measurement of fair values. The results from the regression are summarized in Table *A 18: Pricing of Net Fair Value Assets over the years*. Due to the size of our sample we get a statistically significant difference between the coefficients of the different categories of net fair value assets, which should mean that there is some difference in their pricing. However, the practical implications of these differences are small. According to our results, investors price at \$0.78 each dollar of NFVA1 and NFVA2 disclosed on the balance sheet, while NFVA3 are priced at \$0.71, and NNFVA – at \$0.76. Thus, contrary to previous research (Kolev, 2009; Goh et al., 2009; and Song et al., 2010) arguing that the amount of management discretion matters for the relevance of the accounting information, we find that it does not matter in practice. On the contrary, investors seem to pay very little or no attention to how balance sheet values have been estimated. We find no practical differences between the value attributed, not only between the different fair values categories, but also between the fair value categories and non-fair value estimates. Therefore, the debate surrounding the use of management discretion allowed in estimating financial accounting values seems to be rather outdated, as investors show little or no sensitivity to it.

Figure 7: Pricing of balance sheet items over time

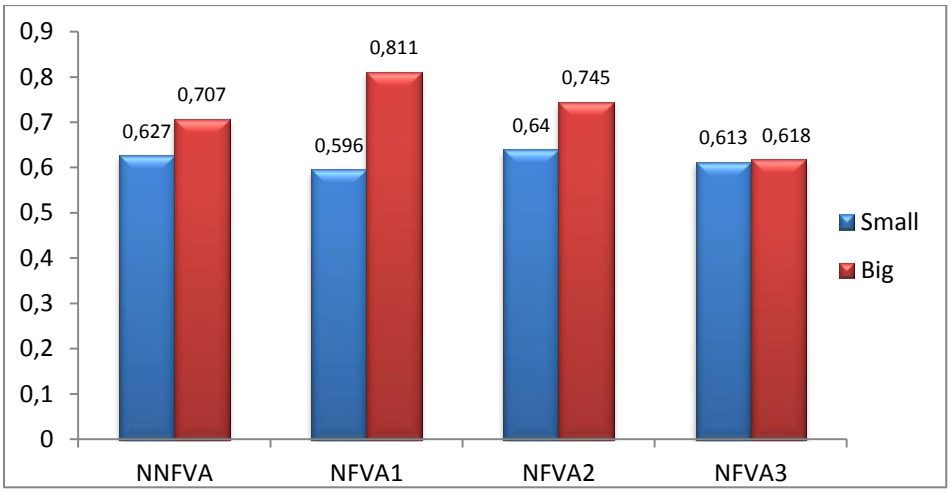


Hypothesis 2b: By testing if the degree of management discretion has mattered for the value relevance of the different fair value categories throughout the years, we notice some sensitivity in 2009 and 2010 (*Table A 18: Pricing of net fair value assets over the years*). This could be observed on *Figure 7: Pricing of balance sheet items over time*) illustrating our regression results. Thus, although the average investor seems insensitive to the way balance sheet values have been estimated (as the results of the previous hypothesis suggest), inputs had some significance in 2009 and 2010. In those years the relevance of NFVA2 and NFVA1 respectively has been considerably higher than the relevance of the other net assets categories. One potential explanation for the upward spike in the relevance of NFVA2 could be the implementation of ASU 2009-12, *Fair value measurements and disclosures (Topic 820)*, which provides guidance on the measurement of fair values of investments in entities without quoted market prices. This, together with other amendments and updates implemented throughout the years, has likely contributed to the observed convergence to equal decision usefulness of the different fair values. By looking at the substantial differences between individual years, we conclude that drawing conclusions from results based on data from one year only is dangerous.

7.3. Relationship between value relevance and risk exposure

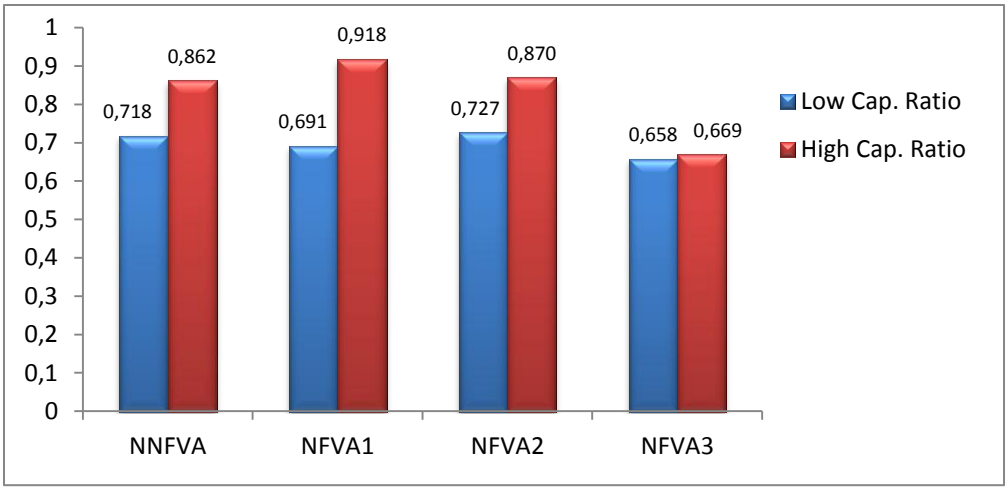
In order to see the impact of different company characteristics over our results, several variables were controlled for.

Figure 8: Difference in the relevance of the Balance Sheet information for Big and Small financial institutions



Hypothesis 3a: First, we consider if the size of a financial institution is a characteristic related to the variation in the relevance of balance sheet values. In other words, we check whether the fair values based on management models are relevant only for big companies but irrelevant for smaller ones. The results of the regression are summarized in *Table A 19: Pricing of net fair value assets with a control variable for size*, and presented graphically in *Figure 8: Difference in the relevance of the Balance Sheet information for Big and Small financial institutions*. The amount of management discretion allowed in the estimates of balance sheet values appears to play almost no role in the pricing of net assets for small companies. Investors value each dollar of NFVA1, NFVA2, NFVA3, and NNFVA, at \$0.60; \$0.64; \$0.61 and \$0.63 respectively. However, when it comes to the balance sheet values of big companies, there seems to be some noticeable difference between the relevance of the different categories of fair values. For big companies investors price each dollar of NFVA1, NFVA2 and NFVA3 at \$0.81; \$0.75 and \$0.62 respectively. Therefore, the amount of management discretion allowed is proportionately related to the relevance of the different categories of fair value estimates, but only for big companies. In contrast, when it comes to small companies, investors are more prone to see estimates based on different categories of inputs rather similar. One possible explanation for these findings might be the degree of analyst coverage for the two groups of companies. Since bigger financial institutions are generally followed more closely by analysts, it is natural to see greater responsiveness of stock prices to small details in the financial reports, such as disclosures regarding fair value categories.

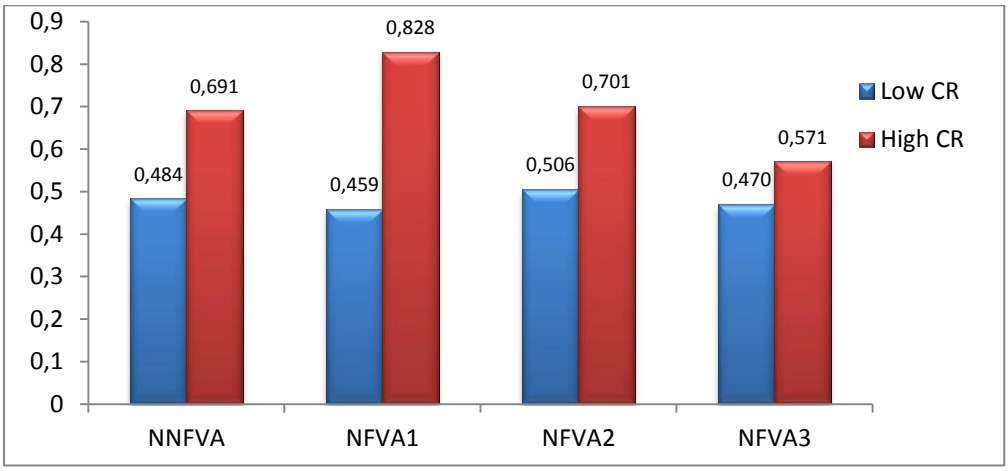
Figure 9: Difference in the relevance of the Balance Sheet information for fin. institutions with High and Low Cap. Ratio



Hypothesis 3b: Testing if the capital ratio is a characteristic with an impact over the value-relevance of the different fair values provides results summarized in *Table A 20: Pricing of net fair value assets with a control variable for capital ratio*, and presented graphically in *Figure 9: Difference in the relevance of the Balance Sheet information for financial institutions with High and Low Capital Ratio*. The empirical tests indicate a slight impact of the amount of management discretion for companies with a high capital ratio. For this group investors attribute $0.92; $0.87 and $0.67 respectively to each dollar of NFVA1, NFVA2 and NFVA3. In contrast, the difference in market pricing of balance sheet values is practically insignificant for companies with a low capital ratio, as all of their net assets are priced at approximately $0.70 per dollar irrespective of the category.[8] However, these results as well might be due to differences in analyst coverage depending on the financial institutions´ capital ratio. It is likely that companies with a high capital ratio, often associated with better credit health, attract more attention from investors. That might result in greater stock price sensitivity to details in financial reports.

[8] However, a note of caution should be raised with regards to that test. As already discussed, the information provided by Compustat on that variable is somewhat restricted – there is a lack of data concerning capital ratio tier 1 for approximately 15% of the observations in our subsample for the period 2007-2012. In order to investigate what type of companies have their capital ratio reported in Compustat, we test the relevance of the fair value information for the companies whose capital ratio is available, and compare those results with the results from the same regression based on the complete sample for that period. Comparing the outcomes in Column 1 on *Table A20: Pricing of fair value assets with a control variable for capital ratio* with the outcomes in *Table A 17: Pricing of net fair value assets* we find that the companies whose capital ratio has been provided in Compustat, generally have net fair value assets that are priced higher. Thus, our results might indicate a smaller difference in the pricing of the different net fair values between companies with better and worse credit health respectively just due to the fact that our sample does not capture a part of the financial institutions whose assets are generally priced lower. Nevertheless, we consider that the sample is big enough to draw general conclusions.

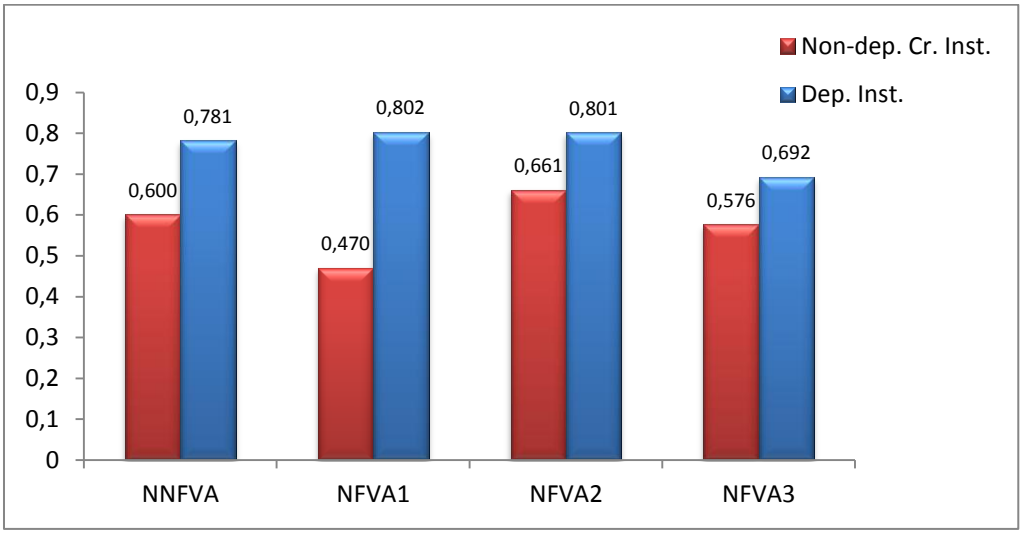
Figure 10: Difference in the relevance of the Balance Sheet information for financial institutions with High and Low Credit Rating



Hypothesis 3c: *Table A 21: Pricing of net fair value assets with a control variable for credit rating*, provides the results of the regression testing whether or not the credit rating has any effect over the perceived role of management discretion. Separating the sample into two groups - companies with high and low credit ratings, we find that there is some difference in the relevance of the different categories of net assets for companies with a high credit rating (See *Figure 10: Difference in the relevance of the Balance Sheet information for financial institutions with High and Low Credit Rating).* Investors value each dollar of NFVA1, NFVA2 and NFVA3 for companies with high credit rating at $0.83; $0.70 and $0.57 respectively. [9] For companies with lower credit ratings, on the other hand, the corresponding values are considerably lower, as they amount to $0.46, $0.50 and $0.47. These results indicate, in line with our previous findings regarding potential proxies for risk, that the sensitivity to managerial discretion is greater amongst companies with higher credit rating. Nonetheless, it is worth highlighting that the value relevance is consistently higher for companies with higher credit rating, regardless of fair value category.

[9] The outcomes of our tests for that hypothesis, though, should also be carefully accepted since in that case we encountered the same issue as for our previous hypothesis. More precisely, the information provided by Compustat on this variable is a also somewhat restricted – there is a lack of data concerning the credit rating for approximately 35% of the observations in our subsample for the period 2007-2012. In order to investigate which companies have their capital ratio reported in Compustat, we test the relevance of the fair value information for the companies that have credit rating reported (Column 1 of *Table A21: Pricing of fair value assets with a control variable for credit rating*). Those results are compared with the results from the same regression based on the complete subsample for the period (*Table A 17: Pricing of Net Fair Value Assets*). Comparing the outcomes, we notice that the companies whose credit rating has been provided in Compustat generally have net fair value assets that are priced higher. However, that should not have a significant impact over our results.

Figure 11: Difference in the relevance of the Balance Sheet information for Non-depository credit institutions and Depository institutions



Hypothesis 3d: The results in *Table A 22: Pricing of net fair value assets with a control variable for Non-depository credit institutions vs. Depository institutions*, provide support for the hypothesis that the nature of the financial institution under consideration does play a significant role in the pricing of the values reported on its balance sheet. Previous researchers have not made such a distinction but our results indicate that it might be an important one. We find that all categories of net fair value assets are less relevant for non-depository credit institutions. Thus, although both types of financial institutions carry a substantial amount of fair values on their balance sheets, their different characteristics lead to different valuation of their net assets by investors.

Figure 11: Difference in the relevance of the Balance Sheet information for Non-depository credit institutions and Depository institutions, illustrating the regression results, highlights another significant point as well. There is almost no variance in the relevance of the different categories of net assets for depository institutions, while there is some noticeable variation for non-depository credit institutions. When it comes to credit institutions, it is surprising that investors price NFVA2 ($0.66) and NFVA3 ($0.58) higher than NFVA1 ($0.47). However, returning to the characteristics of the different financial institutions, one can observe large differences in the composition of fair values between depository institutions and non-depository institutions. Noticeably, the amount of fair value liabilities is substantially higher for non-depository credit institutions. Hence, further analysis in the field might provide interesting insights, although remaining outside the scope of this paper.

Robustness analysis: To test whether certain omitted variables distort our results, we examine if changes in stock prices are associated with changes in book values. *Table A 23: Price changes and changes in net assets 2003-2012 (I) and 2007-2012 (II)* presents the results of the regressions. It can be inferred from the results that changes in share price are significantly associated with changes in both earnings and different categories of net assets. These results mitigate concerns about the potential impact of fluctuating market prices on our results. Furthermore, the results presented in column (II) of the same table support our previous conclusions, as we find that there is practically no difference between the value relevance of different net asset categories.

8. Conclusion

By addressing the decision usefulness of the information provided in the reports of financial institutions, this study contributes to the traditional debate about the valuation approaches applied in accounting. More precisely, we build on previous literature by examining the value-relevance of different fair value estimates of financial instruments during the period 2003-2012. We investigate if the degree of management discretion allowed when deriving fair value estimates plays a role for their relevance, estimated by their association with stock prices. Using a sample superior to prior studies both in terms of size and time period, we obtain results contradictory to the conclusions drawn by other researchers. Thus, we bring a new perspective over the existing accounting practices related to fair value accounting. Moreover, in order to strengthen the applicability of our results, we examine if specific company characteristics are associated with deviations from our general results. On the overall, our paper develops fresh insights into the latest trends in investors' perceptions concerning the value relevance of balance sheet information, and more precisely of the fair value estimates of financial institutions in the US.

We find a significant difference in the decision usefulness of accounting information between the two periods 2003-2007 and 2008-2012. Investors have increased the significance given to the book value of equity of a given financial institution, while decreasing the importance attributed to its financial performance, i.e. EPS. The change in value-relevance of EPS likely reflects changes in market prices, as the earnings started a rapid decline during late 2007. The relevance of book value of equity, however, has moved in the opposite direction. Therefore, we believe that factors other than the market environment might have influenced their relevance. One factor with potential influence could be the introduction of new accounting standards, requiring more detailed and transparent disclosures about the fair value positions of financial institutions. Thus, one could argue that standard setters have managed to increase the decision usefulness of balance

sheet information for financial institutions. Meanwhile, some of the improved relevance might be attributed to increased expertise and awareness among investors with regards to fair values and their measurement.

Our second key contribution in this growing field of research are the findings that the amount of management discretion allowed in the valuation of fair values has little or no influence on the perceived value relevance of fair values. Critics have often referred to marking-to-model as "marking-to-myth" (Kolev, 2009), since the use of management assumptions and estimations have been criticized for being biased and unreliable. Our study, however, provides evidence against this criticism. We find that investors do not value mark-to-model net assets considerably lower than they do other balance sheet items. Hence, the restricted samples in previous research might have adversely impacted their conclusions. In contrast, our study mitigates these limitations and proves that level 3 inputs are practically similar in relevance to level 1 and level 2 inputs.

However, if investors do not differentiate between the different categories of fair values, one could question why companies should report these values and incur all the costs associated with preparing such detailed information. One reason why that might be necessary is investors' demand for more detailed financial disclosures. It seems like investors do not really care about the valuation technique/procedure behind the valuation of certain assets or liabilities, as long as these valuation techniques/procedures are disclosed. Put it differently, investors are more skeptical when the valuation is done in a "black box". Even if they do not differentiate between the categories of fair values in terms of pricing, they do value the increased transparency and comparability arising from the disclosure requirements. Thus, the results imply that investors demand the information in full, and, regardless of the amount of management discretion, they consider the reliability of the different fair value levels to be close to equal as long as it is disclosed.

Furthermore, we observe cases when the amount of management discretion plays a role for the significance of the fair value estimates. However, in these cases, the differences are small and hold only for companies with low risk profiles, defined in terms of large size, good credit rating and high capital ratio. One potential explanation for these differences might be the extensive analyst and investor coverage of large and/or credit-worthy companies. The more often the financial information is reviewed, and the greater the following, the greater the share price sensitivity is. Therefore, even if there is some difference in the relevance of the different fair

value categories, it is considerably smaller than what previous researchers suggest, and holds just for very stable companies. That is in line with our conclusion of a convergence in the value relevance of the different fair value categories.

In addition to these company characteristics, we also examined whether the nature of the financial institutions is a factor affecting investors' perception about the role of management discretion in estimating fair values. Firstly, we find that the fair values of depository institutions are valued higher than those of non-depository credit institutions. These findings suggest differences in the valuation of the two types of financial institutions. A potential explanation might be the variance in risk exposure between depository and non-depository institutions, in line with our previously drawn conclusions. Secondly, we find that investors care how a given fair value is estimated by non-depository institutions. Surprisingly, for those financial institutions, the estimates based on some degree of management discretion have higher relevance from investors' perspective, a somewhat contradictory finding emphasizing the need for future research in the field.

Finally, we acknowledge that our research is based on a sample of US financial institutions, limiting the applicability of the results in an international setting. Conducting similar research on a sample of both U.S and European financial institutions could provide information about potential differences in the value relevance of financial reports prepared in accordance with US GAAP and IFRS.

Attention has recently been drawn to the perceived negative features of fair value accounting. In this study we highlight the advantages of this widely debated measurement approach, by illustrating its increasing decision usefulness to investors.

Reference list

AAA Financial Accounting Standards Committee 2005, "Response to the FASB's exposure draft on fair value measurement", *Accounting Horizons,* vol. 19, no. 3, pp. 187-196.

Allen, F. & Carletti, E. 2008, "Mark-to-market accounting and liquidity pricing", *Journal of Accounting and Economics,* vol. 45, pp. 358-378.

Allen, L. & Bali, T. 2004, "Cyclicality in Catastrophic and Operational Risk Measurements", [Online], Available from: http://archive.nyu.edu/fda/bitstream/2451/26526/2/FIN-04-019.pdf. [April, 30, 2013].

Barth, M. 1994, "Fair value accounting: evidence from investment securities and the market valuation of banks", *The Accounting Review,* vol. 69, no. 1, pp. 1-25.

Barth, M., Beaver, W. & Landsman, W. 2001, "The relevance of the value relevance literature for financial accounting standard setting: another view", *Journal of Accounting and Economics,* vol. 31, pp. 77-104.

Barth, M., Beaver, W. & Landsman, W. 1996, "Value relevance of banks' fair value disclosures under SFAS No 107", *The Accounting Review,* vol. 71, no. 4, pp. 513-537.

Barth, M. & Landsman, W. 2010, "How did financial reporting contribute to the financial crisis?", *European Accounting Review,* vol. 19, no. 3, pp. 399-423.

Barth, M., Landsman, W. & Land, A. 2008, "International accounting standards and accounting quality", *Journal of* Accounting Research, vol. 46, no. 3, pp. 467-498.

Basel Committee on Banking Supervision June, 2011, "Basel III: A global regulatory framework for more resilient banks and banking systems", *Bank for International Settlements*, [Online], Available from: http://www.bis.org/publ/bcbs189.pdf. [April, 20, 2013].

Bauman, M. 1999, "An empirical investigation of conservatism in book value measurement", *Managerial Finance,* vol. 25, no. 12, pp. 42-54.

Bosch, P. "Value relevance of the fair value hierarchy of IFRS 7 in Europe - How reliable are mark-to-model fair values?", *2012,* [Online], Available from: http://ideas.repec.org/p/fri/fribow/fribow00439.html. [March, 01, 2013].

Carroll, T., Linsmeier, T. & Petroni, K. 2003, "The reliability of fair value versus historical cost information: evidence from closed-end mutual funds", *Journal of Accounting, Audit and Finance,* vol. 18, no. 1, pp. 1-24.

Cheng, K. 2009, "Fair value's 'how' meets 'when'.", *The CPA Journal,* vol. 79, no. 8, pp. 26-29.

Collins, D., Maydew, E. & Weiss, I. 1997, "Changes in the value-relevance of earnings and book values over the past forty years", *Journal of Accounting and Economics,* vol. 24, pp. 39-67.

Collins, J. & Kempsley, D. 2000, "Capital gains and dividend taxes in firm valuation: evidence of triple taxation", *The Accounting Review,* vol. 75, no. 4, pp. 405-427.

Council of Mortgage Lenders, *Basel II - questions and answers2013*, [Online]. Available: http://www.cml.org.uk/cml/policy/issues/721 [2013, April, 15].

Dahmash, F. & Quabajeh, M. 2012, "Value relevance of Ohlson Model with Jordanian Data ", *Interdisciplinary Journal of Contemporary Research in Business,* vol. 3, no. 11, pp. 551-560.

Danbolt, J. & Rees, W. 2008, "An experiment in fair value accounting: UK investment vehicles", *European Accounting Review,* vol. 17, no. 2, pp. 271-303.

Dechow, P., Hutton, A. & Sloan, R. 1999, "An empirical assessment of the residual income valuation model", *Journal of Accounting and Economics,* vol. 26, pp. 1-34.

Dietrich, J., Harris, M. & Muller, K. 2000, "The reliability of investment property fair value", *Journal of Accounting and Economics,* vol. 30, no. 2, pp. 125-158.

Duncan, K. & Moores, K. 1988, "Usefulness of CCA information for investor decision making:a laboratory experiment.", *Accounting and Business Research,* vol. 18, no. 70, pp. 121-132.

Eccher, E., Ramesh, K. & Thiagarajan, S. 1996, "Fair value disclosures by bank holding companies.", *Journal of Accounting and Economics,* vol. 22, no. 1-3, pp. 79-117.

Elliott, J. & Hanna, J. 1996, "Repeated Accounting Write-Offs and the Information Content of Earnings", *Journal of Accounting Research,* vol. 34, pp. 135-155.

Fama, E. & French, K. 1993, "Common risk factors in the returns on stocks and bonds", *Journal of Financial Economics,* vol. 33, no. 1, pp. 3-56.

Fiechter, P. & Novotny-Farkas, Z. "Pricing of fair values during the financial crisis: international evidence", *2011,* [Online], Available from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1758683. [February, 15, 2013].

Financial Accounting Standards Board 2010, *ASU 2010-06, Fair value measurements and disclosures (Topic 820): Improving disclosures about fair value measurements*, Norwalk: FASB.

Financial Accounting Standards Board 2010, *Conceptual Framework for Financial Reporting*, Norwalk: FASB.

Financial Accounting Standards Board 2009, *ASU 2009-05, Fair value measurements and disclosures (Topic 820): Measuring liabilities at fair Value*, Norwalk: FASB.

Financial Accounting Standards Board 2009, *ASU 2009-12, Fair value measurements and disclosures (Topic 820): Investments in certain entities that calculate net asset per share (or its equivalent)*, Norwalk: FASB.

Financial Accounting Standards Board 2009, *FSP FAS 107-1 and APB 28-1, Interim disclosures about fair value of financial instruments*, Norwalk: FASB.

Financial Accounting Standards Board 2009, *FSP FAS 115-2 and FAS 124-2, Recognition and Presentation of Other-Than-Temporary Impairments*, Norwalk: FASB.

Financial Accounting Standards Board 2009, *FSP FAS 157-4, determining fair value when the volume and level of activity for the assets or liability have significantly decreased and identifying transactions that are not orderly*, Norwalk: FASB.

Financial Accounting Standards Board 2008, *FSP FAS 157-1, Application of FASB Statement No. 157 to FASB Statement No. 13 and Other Accounting Pronouncements That Address Fair Value Measurements for Purposes of Lease Classification or Measurement under Statement 13.*, Norwalk: FASB.

Financial Accounting Standards Board 2008, *FSP FAS 157-2, effective date of FASB statement No. 157*, Norwalk: FASB.

Financial Accounting Standards Board 2008, *FSP FAS 157-3, determining the fair value of a financial asset when the market for that asset is not active*, Norwalk: FASB.

Financial Accounting Standards Board 2006, *Statement of Financial Accounting Standards No. 157, Fair Value Measurement*, Norwalk: FASB.

Financial Accounting Standards Board 1998, *Statement of Financial Accounting Standards No. 133, Accounting for derivative instruments and hedging activities*, Norwalk: FASB.

Financial Accounting Standards Board 1993, *Statement of Financial Accounting Standards No. 114, Accounting by creditors for Impairment of a loan*, Norwalk: FASB.

Financial Accounting Standards Board 1993, *Statement of Financial Accounting Standards No. 115, Accounting for certain investments in debt and equity securities*, Norwalk: FASB.

Financial Accounting Standards Board 1991, *Statement of Financial Accounting Standards No. 107, Disclosures about faie value of financial instruments*, Norwalk: FASB.

Financial Accounting Standards Board 1982, *Statement of Financial Accounting Standards No. 65, Accounting for Certain Mortgage Banking Activities*, Norwalk: FASB.

Financial Accounting Standards Board 1975, *Statement of Financial Accounting Standards No. 5, Accounting for contingencies*, Norwalk: FASB.

Finansinspektionen August, 31, 2010-last update, Frågor och svar – HQ Bank. Available: http://www.fi.se/upload/60_Konsument/fos_HQ_100831_konsument.pdf [February, 15, 2013].

Forbes, S. 2009, "End mark-to-market", [Online], Available from: Forbes.com.

Francis, J. & Schipper, K. 1999, "Have Financial Statements Lost Their Relevance?", *Journal of Accounting Research,* vol. 37, no. 2, pp. 319-352.

Gebhardt, W., Lee, C. & Swaminathan, B. 2001, "Toward an implied cost of capital", *Journal of Accounting Research,* vol. 39, no. 1, pp. 135-176.

Giner, B. & Iniguez, R. 2006, "An empirical assessment of the Feltham-Ohlson models considering the sign of abnormal earnings", *Accounting and Business Research,* vol. 36, no. 3, pp. 169-190.

Godfrey, J., Hodgson, A., Tarca, A., Hamilton, J. & Holmes, S. 2010, *Accounting Theory,* 7th edition, John Wiley & Sons Australia, Ltd, 42 McDougall Street, Milton Qld 4064.

Goh, B., Ng, J. & Yong, K. "Market pricing of banks' fair value assets reported under SFAS 157 during the 2008 economic crisis", *2009,* [Online], . Available from: http://web-docs.stern.nyu.edu/old_web/emplibrary/Market%20pricing%20of%20banks%20fair....pdf. [February, 15, 2013].

Gujarati, D. 2003, *Basic Econometrics,* 4th Edition edn, McGraw-Hill.

Hand, J. & Landsman, W. 1999, "The pricing of dividends in equity evaluation", [Online], . Available from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=169300.

Hardy, M. 1993, *Regression with dummy variables,* Sage Publications, Inc., USA.

Heaton, J., Lucas, D. & McDonald, R. 2010, "Is mark-to-market accounting destabilizing? Analysis and implications for policy", *Journal of Monetary Economics,* vol. 57, no. 1, pp. 64-75.

Hodder, L., Mayew, M., McAnally, M. & Weaver, C. 2006, "Employee stock option fair value estimates: Do managerial discretion and incentives explain accuracy?", *Contemporary Accounting Research,* vol. 23, no. 4, pp. 933-975.

Huber, P. 1981, *Robust Statistics,* Wiley Series in Probability and Mathematical Statistics, John Wiley & Sons.

Isaac , W. October, 9, 2008-last update*, Former FDIC Hair blames SEC for Credit Crunch* [Homepage of Consumer News and Business Channel], [Online]. Available: http://www.cnbc.com/id/27100454. [February,1, 2013].

Kadous, K., Koonce, L. & Thayer, J. 2011, "Do Financial Statement Users Judge Relevance Based on Properties of Reliability?", *American Accounting Association,* vol. 87, no. 4, pp. 1335-1356.

Khurama, I. & Kim, M. 2003, "Relative value relevance of historical cost vs. fair value: Evidence from bank holding companies", *Journal of Accounting and Public Policy,* vol. 22, pp. 19-42.

King, M. 2008, "Be careful what you ask for: Is fair value accounting really fair?", *International Journal of Disclosure and Governance,* vol. 5, no. 4, pp. 301-311.

Kohlbeck, M. 2008, "An analysis of recent events on the perceived reliability of fair value measures in the banking industry.
", [Online], . Available from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1117728. [February, 28, 2013].

Kolev, K. 2009, "Do Investors Perceive Marking-to-Model as Marking-to-Myth? Early Evidence from FAS 157 Disclosure", [Online], Available from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1336368. [February, 14, 2013].

Landsman, W., Rountree, B. & Soonawalla, K. 2012, "Do analyst earnings forecast revisions and bank stock returns reflect unrealized changes in investments fair values?", [Online], . Available from: http://www.sbs.ox.ac.uk/research/finance/Documents/Finance%20Papers%20MT2012/Kazbi%20Soonawalla%20-%2015th%20November%202012.pdf. [February, 26, 2013.].

Laux, C. & Leuz, C. 2010, "Did fair value accounting contribute to the financial crisis?", *Journal of Economic Perspectives,* vol. 24, no. 1, pp. 93-118.

Laux, C. & Leuz, C. 2009, "The crisis of fair-value accounting: making sense of the recent debate", *Accounting, Organizations and Society,* vol. 34, pp. 826-834.

Lin, S. 2007, "Value Relevance of Comprehensive Income and Its Components: Evidence from Major European Capital Markets", [Online], Available from: http://www.cereg.dauphine.fr/cahiers_rech/drmfinance0209.pdf. [March, 15, 2013].

Magnan, M. 2009, "Fair value accounting and the financial crisis: messenger or contributor?", *Accounting Perspectives,* vol. 8, no. 3, pp. 189-213.

Maines, L. & Wahlen, J. 2006, "The nature of accounting information reliability: inferences from archival and experimental research", *Accounting Horizons,* vol. 20, no. 4, pp. 399-425.

Maydew, E., 1993, "An empirical evaluation of earnings and book values in security valuation", Unpublished manuscript University of Iowa

Martin, R., Rich, J. & Wilks, T. 2006, "Auditing Fair Value Measurements: A Synthesis of Relevant Research", *Accounting Horizons,* vol. 20, no. 3, pp. 287-303.

Mathews, R. 1965, "Price-Level Changes and Useless Information", *Journal of Accounting Research,* vol. 3, no. 1, pp. 133-155.

McCaslin, T. & Stanga, K. 1983, "Related qualities of useful accounting information.", *Accounting and Business Research,* vol. 14, pp. 35-41.

McDonald, J. & Fisher, A. 1972, "New-Issue Stock Price Behavior", *The Journal of Finance,* , pp. 97-102.

Moyer, S. 1990, "Capital adequacy ratio regulations and accounting choices in commercial banks", *Journal of Accounting and Economics,* vol. 13, pp. 123-154.

Nelson, K. 1996, "Fair value accounting for commercial banks: An empirical analysis of FAS No.107", *The Accounting Review,* vol. 71, no. 2, pp. 161-182.

O´Brien, J. 2005, "Relevance and Reliability of Fair Values: Discussion of Issues Raised in "Fair Value Accounting for Financial Instruments: Some Implications for Bank Regulation"", [Online], Available from: http://www.bis.org/events/armpr05/obrien.pdf. [March, 08, 2013].

Ohlson, J. 2001, "Earnings, books value and dividends in equity valuation: an empirical perspective.", *Contemporary Accounting Research,* vol. 18, no. 1, pp. 107-120.

Ohlson, J. 1995, "Earnings, book values and dividends in equity valuation", *Contemporary Accounting Research,* vol. 11, pp. 661-687.

Olson, S. "Fair value accounting and reporting disclosures", *2010,* [Online], Available from: http://digitalcommons.bryant.edu/cgi/viewcontent.cgi?article=1004&context=honors_accounting&sei-redir=1&referer=http%3A%2F%2Fscholar.google.se%2Fscholar%3Fq%3DFair%2BValue%2BAccounting%2Band%2B%2BReporting%2BDisclosures%2B%26btnG%3D%26hl%3Den%26as_sdt%3D0%252C5%26as_ylo%3D2009#search=%22Fair%20Value%20Accounting%20Reporting%20Disclosures%22. [February, 28, 2013].

OTC Bulletin Board, *General Questions*. Available: http://www.otcbb.com/faqs/otcbb_faq.stm [May, 1, 2013].

Petroni, K. & Wahlen, J. 1995, "Fair values of equity and debt securities and share prices of property-liability insurers", *The Journal of Risk and Insurance,* vol. 62, no. 4, pp. 719-737.

Pinnuck, M. 2012, "A review of the role of financial reporting in the global financial crisis", *Australian Accounting Review,* vol. 60, no. 22, pp. 1-14.

Plantin, G., Sapra, H. & Shin, H. 2008, "Marking-to-market: panacea or Pandora's box?", *Journal of Accounting Research,* vol. 46, no. 2, pp. 435-460.

Rorem, C. 1929, "Replacement cost in accounting valuation", *The Accounting Review,* , pp. 167-174.

Ryan, S. 2008, *Fair value accounting: Understanding the issues raised by the credit crunch*, The Council of Institutional investors.

Silvestri, A. & Veltri, S. 2012, "A test of the Ohlson model on the Italian Stock Exchange", *Accounting & Taxation,* vol. 4, no. 1, pp. 83-94.

Song, S., Thomas, W. & Yi, H. 2010, "Value relevance of FAS No. 157: fair value hierarchy information and the impact of corporate governance mechanisms", *The Accounting Review,* vol. 85, no. 4, pp. 1375-1410.

The Congress of the United States of America 2008, *Emergency Economic Stabilization Act*, http://www.gpo.gov/fdsys/pkg/BILLS-110hr1424enr/pdf/BILLS-110hr1424enr.pdf.

US Securities and Exchange Commission 2008, *Report and Recommendations Pursuant to Section 133 of the Emergency Economic Stabilization Act of 2008: Study on Mark-to-Market Accounting*, http://www.sec.gov/news/studies/2008/marktomarket123008.pdf.

Valdés, A. & Vázquez, R. 2010, "Ohlson model by cointegration with Mexican data", *Contaduria y Administracion,* vol. 232, pp. 131-142.

Venkatachalam, M. 1996, "Value-relevance of banks´ derivatives disclosures", *Journal of Accounting and Economics,* vol. 22, pp. 327-355.

Wallison, P. 2008, "Fair Value Accounting: A Critique", [Online], Available from: http://67.208.89.102/files/2008/07/28/20080728_23336JulyFSOg.pdf. [March, 30, 2013].

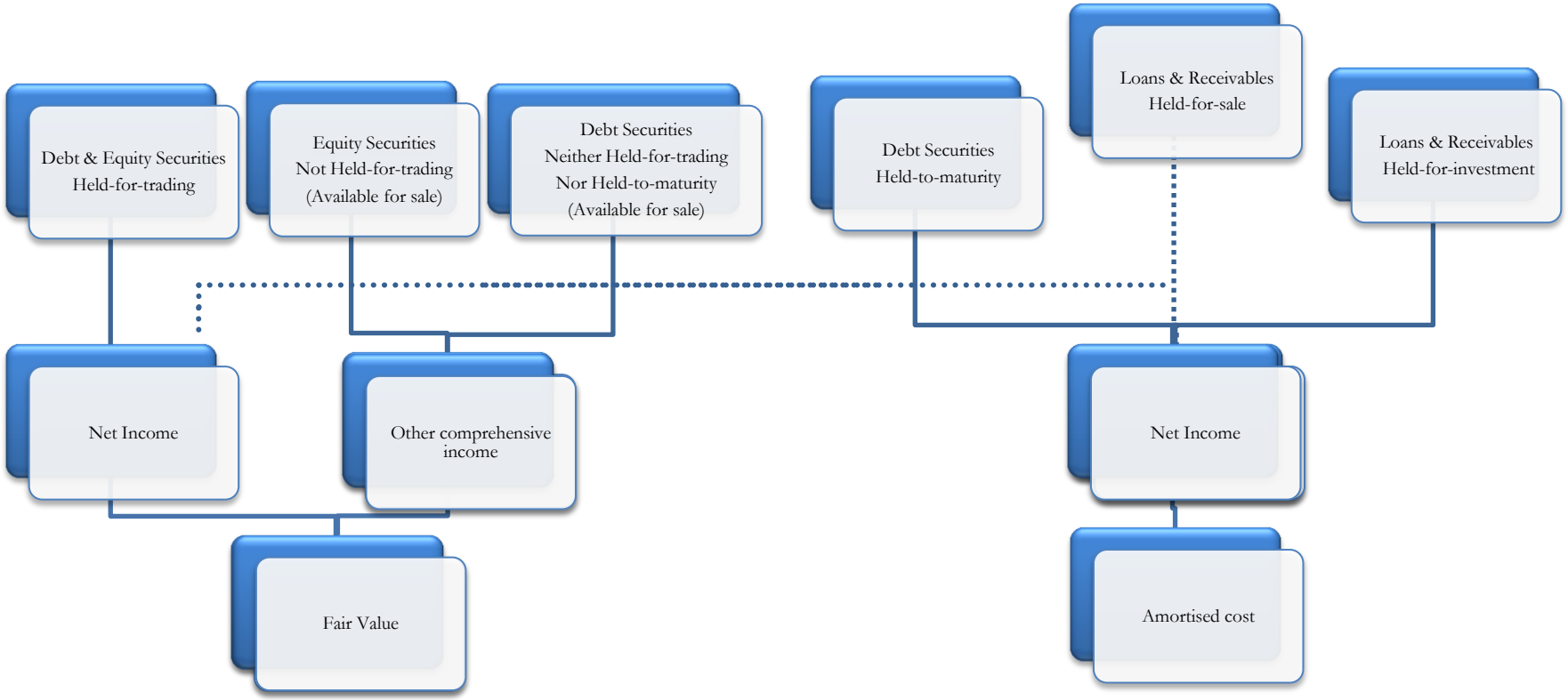
Whalen, R. 2008, *The subprime crisis – causes, effect and consequences*, Networks Financial Institute, http://ssrn.com/abstract=1113888.

Wharton Research Data Services, Available: https://wrds-web.wharton.upenn.edu/wrds/index.cfm [February, 20, 2013]

Yee, K. 2000, "Opportunities knocking residual income valuation of an adaptive firm", *Journal of Accounting, Auditing and Finance,* vol. 15, no. 3, pp. 225-266.

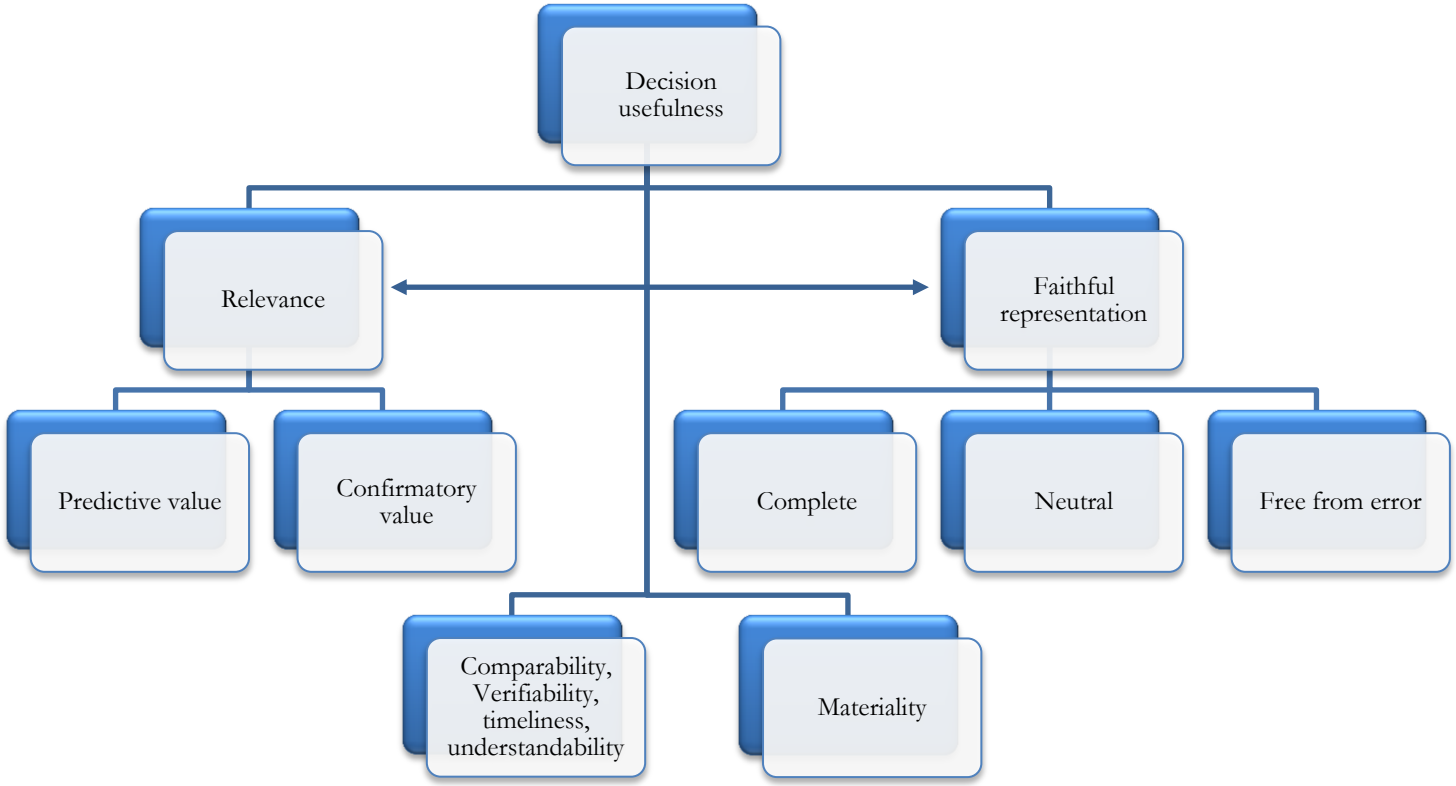
Appendix

Figure A 1: The classification and measurement of financial instruments



Source: SFAS 115, SFAS 65, SFAS 5, SFAS 114, SFAS 107

Figure A 2: Qualities of Financial Reporting



Source: Conceptual framework for financial reporting, 2010

Table A 1: Sample construction

Steps	Number of observations dropped	Number of observations remaining
Quarterly Balance Sheet Information obtained from Compustat North America Fundamentals Quarterly		**38 189**
Market information obtained from Compustat North America Security Daily	8 838	29 351
Observations whose shares are denominated in US dollars (Removal of observations with shares denominated in foreign currency)	274	29 077
Observations without errors (Removal of data errors)	3	29 074
Observations with a single quarterly report released per day (Removal of observations whose quarterly reports have been released simultaneously with more recent quarterly information)	60	29 014
Observations with values for all variables of interest (Removal of observations with missing values for total assets, total liabilities, preference shares, earnings and common shares outstanding)	551	28 463
Observations with common shares outstanding (Removal of observations whose common shares outstanding are 0)	12	28 451
Observations without outliers for testing Hypothesis 1 (a & b) (Removal of three companies with extremely low BM ratio)	95	**28 356**

Table A 2: Observations per year and quarter for testing Hypothesis 1

	Quarter				
Year	**1**	**2**	**3**	**4**	**Total**
2003	774	840	833	785	3 232
2004	823	816	801	780	3 220
2005	798	789	785	761	3 133
2006	745	762	757	736	3 000
2007	742	734	728	693	2 897
2008	714	708	704	659	2 785
2009	681	672	667	637	2 657
2010	668	658	654	649	2 629
2011	602	636	637	640	2 515
2012	633	630	590	435	2 288
Total	**7 180**	**7 245**	**7 156**	**6 775**	**28 356**

Table A 3: Exchange listings over time for the period 2003-2012

	Stock exchange					
YR	**New York Stock Exchange**	**American Stock Exchange**	**OTC Bulletin Board**	**NASDAQ-NMS Stock Market**	**Other-OTC**	**Total**
2003	325	99	159	2 030	619	3 232
2004	327	84	157	2 002	650	3 220
2005	323	73	138	1 965	634	3 133
2006	307	64	125	1 881	623	3 000
2007	303	64	116	1 787	627	2 897
2008	289	62	111	1 737	586	2 785
2009	288	62	113	1 709	485	2 657
2010	282	59	135	1 723	430	2 629
2011	271	55	135	1 669	385	2 515
2012	270	47	114	1 568	289	2 288
Total	**2 985**	**669**	**1 303**	**18 071**	**5 328**	**28 356**
Percentage	10.53	2.36	4.60	63.73	18.79	100.00

Table A 4: Sample construction for testing Hypotheses 2, 3 & 4

Steps	**Number of observations dropped**	**Number of observations remaining**
Observations without outliers for testing Hypothesis 1 (a & b) (Removal of three companies with extremely low BM ratio)		**28 356**
Observations with information available for testing Hypothesis2.a. (Removal of observations with missing values for fair value assets and liabilities of level 1, 2 & 3, as well as observations with errors in the data)	19 407	**8 949**
Observations with information available for testing Hypothesis2.b. (Removal of the observations for 2007)	48	8 901
Observations with information available for testing Hypothesis3.a. (Removal of the observations with missing market value information)	27	8 922
Observations with information available for testing Hypothesis3.b. (Removal of the observations with missing capital ratio)	1331	7 618
Observations with information available for testing Hypothesis3.c. (Removal of the observations with missing credit rating)	3259	5 690
Observations with information available for testing Hypothesis 4.		**8 949**

Table A 5: Observations per year and quarter for testing Hypothesis 2

	Quarter				
Year	**1**	**2**	**3**	**4**	**Total**
2007	10	11	11	16	48
2008	359	401	465	466	1 691
2009	505	489	488	471	1 953
2010	495	486	494	495	1 970
2011	445	477	463	479	1 864
2012	478	466	425	54	1 423
Total	**2 292**	**2 330**	**2 346**	**1 981**	**8 949**

Table A 6: Exchange listing over time for the observations included in the sample for tests of Hypothesis 2

	Stock Exchange					
Year	**New York Stock Exchange**	**American Stock Exchange**	**OTC Bulletin Board**	**NASDAQ-NMS Stock Market**	**Other-OTC**	**Total**
2007	5	0	0	35	8	48
2008	151	40	59	1,111	330	1,691
2009	160	50	69	1,335	339	1,953
2010	180	52	87	1,350	301	1,970
2011	157	41	96	1,295	275	1,864
2012	133	29	61	1,026	174	1,423
Total	**786**	**212**	**372**	**6,152**	**1,427**	**8,949**
Percentage	8.78	2.37	4.16	68.75	15.95	100.00

Table A 7: Descriptive statistics for 2003-2012

Variable	Obs	Mean	S.D.	Min	0.25	Median	0.75	Max
Price	28356	20.97	32.31	0.00	9.45	16.20	25.50	1350.00
EPS	28356	0.25	1.54	-26.98	0.09	0.26	0.45	123.64
TA ps	28356	170.84	319.44	0.00	86.24	135.15	190.69	11961.36
TL ps	28356	155.26	296.82	-0.00	76.78	122.32	173.64	10637.16
BVEQ*	28356	15.11	24.94	-41.79	8.49	12.29	17.17	1324.20
BM	28356	0.97	3.46	-286.61	0.53	0.76	1.14	152.32
Capital Ratio	21301	11.98	4.81	-13.48	9.62	11.30	13.48	191.83

Table A 8: Time-series characteristics (means) for 2003-2012

Variable\Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Price	24.71	25.83	25.93	26.60	22.59	15.93	13.40	16.20	16.53	17.93
EPS	0.39	0.38	0.40	0.40	0.29	(-0.09)	(-0.10)	0.14	0.28	0.35
TA ps	160.90	157.86	160.73	165.20	173.77	183.82	183.86	185.32	176.44	166.98
TL ps	146.57	143.72	146.32	150.31	158.15	167.99	167.72	168.28	159.01	149.75
BVEQ*	14.22	14.04	14.34	14.83	15.54	15.48	14.73	15.95	16.43	16.36
BM	0.51	0.49	0.45	0.55	0.77	1.53	1.80	1.42	1.42	1.16
Capital Ratio	11.57	12.04	11.95	11.59	11.55	11.03	11.40	12.19	13.35	13.60

Table A 9: Descriptive statistics for 2007-2012

Variable	Obs	Mean	S.D.	Min	0.25	Median	0.75	Max
Price	8949	15.22	29.33	0.00	5.30	9.96	16.51	518.71
EPS	8949	0.06	1.22	-26.98	0.01	0.14	0.33	14.79
BVEQ*	8949	14.93	22.39	-41.79	7.78	12.01	17.32	604.85
BM	8949	1.52	3.58	-51.93	0.84	1.16	1.70	152.32
TFVA ps	8949	30.77	64.03	0.00	8.36	18.76	35.09	2110.35
TFVL ps	8949	2.15	40.33	0.00	0.00	0.00	0.02	1659.99
FVA/TA	8949	0.17	0.14	0	0.08	0.16	0.23	1.00
NFVA/TA	8949	1.80	26.23	-1236.34	0.08	0.15	0.23	1393.01
NFVA	8949	28.62	46.42	-88.92	7.95	18.34	34.54	1344.76
NFVA1	8949	1.81	18.28	-35.95	0.00	0.00	0.26	1212.20
NFVA2	8949	25.75	38.41	-88.92	6.17	16.56	32.25	751.07
NFVA3	8949	1.07	12.03	-78.59	0.00	0.00	0.20	578.99
NNFVA	8949	-13.69	33.25	-749.35	-19.47	-6.79	1.49	153.99
Market Cap.	8922	857.61	5152.90	0.07	30.84	72.87	259.63	124645.35
Capital Ratio	7618	12.24	5.51	-13.48	9.61	11.71	14.09	139.37

Table A 10: Time-series characteristics (means) for 2007-2012

Variable\Year	2007	2008	2009	2010	2011	2012
Price	15.29	15.52	12.75	15.37	15.81	17.26
EPS	0.22	(-0.12)	(-0.16)	0.07	0.21	0.32
BVEQ*	11.30	15.02	13.63	14.86	15.79	15.66
BM	0.81	1.60	1.90	1.37	1.44	1.26
TFVA ps	14.01	25.39	28.28	30.27	36.53	34.30
TFVL ps	4.46	0.60	2.01	1.66	4.14	2.17
FVA/TA	0.13	0.15	0.16	0.17	0.19	0.20
NFVA/TA	1.00	1.48	1.40	1.98	2.81	1.42
NFVA	9.55	24.79	26.27	28.61	32.39	32.12
NFVA1	2.79	2.91	1.50	1.80	1.61	1.15
NFVA2	6.41	20.71	23.67	25.76	29.85	29.85
NFVA3	0.35	1.16	1.10	1.05	0.93	1.12
NNFVA	1.75	(-9.76)	(-12.64)	(-13.74)	(-16.60)	(-16.46)
Market cap.	2360.10	846.10	607.98	808.98	882.33	1199.11
Capital Ratio	10.61	11.10	11.35	12.18	13.26	13.60
Credit rating	B	B	B	B	B	B

Table A 11: Comparison of variables for Depository vs Non-depository Credit institutions

Variable	n	Mean	S.D.	Min	0.25	Median	0.75	Max
Price								
Dep. Inst.	26340	21.22	32.88	0.00	9.90	16.50	25.69	1350.00
Non-Dep.Cr.Inst.	2016	17.84	23.35	0.00	4.03	10.80	23.36	223.45
BVEQ*								
Dep. Inst.	26340	15.38	25.60	-16.80	8.78	12.51	17.29	1324.20
Non-Dep.Cr.Inst.	2016	11.60	13.17	-41.79	4.10	8.65	15.04	83.52
BM								
Dep. Inst.	26340	0.98	2.24	-152.77	0.54	0.76	1.13	152.32
Non-Dep.Cr.Inst.	2016	0.80	10.11	-281.61	0.41	0.74	1.25	145.18
TFVA ps								
Dep. Inst.	8401	30.36	56.58	0.00	9.38	19.70	36.01	2110.35
Non-Dep.Cr.Inst.	548	37.09	133.66	0.00	0.01	1.04	12.95	827.17
TFVL ps								
Dep. Inst.	8401	0.81	27.56	0.00	0.00	0.00	0.01	1659.99
Non-Dep.Cr.Inst.	548	22.67	120.39	0.00	0.00	0.04	0.50	841.84
EPS								
Dep. Inst.	26340	0.25	1.53	-23.75	0.09	0.26	0.44	123.64
Non-Dep.Cr.Inst.	2016	0.21	1.67	-26.98	-0.00	0.21	0.58	14.79
NFVA1								
Dep. Inst.	8401	1.86	18.78	-35.95	0.00	0.00	0.27	1212.20
Non-Dep.Cr.Inst.	548	1.05	7.03	-25.74	0.00	0.00	0.14	95.95
NFVA2								
Dep. Inst.	8401	27.04	38.93	-88.92	7.83	17.88	33.52	751.07
Non-Dep.Cr.Inst.	548	6.03	21.09	-37.52	0.00	0.00	1.96	150.76
NFVA3								
Dep. Inst.	8401	0.66	2.98	-13.22	0.00	0.00	0.16	51.45
Non-Dep.Cr.Inst.	548	7.34	46.78	-78.59	0.00	0.00	1.28	578.99
NNFVA								
Dep. Inst.	8401	-14.42	30.31	-739.91	-20.56	-7.61	0.59	153.99
Non-Dep.Cr.Inst.	548	-2.63	61.99	-749.35	-1.24	4.46	12.34	67.30

Table A 12: Comparison of variables for Depository vs Non-depository Credit institutions from 2007-2012

Variable\Year	2007	2008	2009	2010	2011	2012
Price						
Dep. Inst.	15.29	15.72	12.88	15.35	15.94	17.17
Non-Dep.Cr.Inst.	N/A	11.83	10.93	15.72	13.78	18.40
BVEQ*						
Dep. Inst.	11.30	15.11	13.81	15.07	16.11	15.91
Non-Dep.Cr.Inst.	N/A	13.50	11.11	11.73	10.53	12.52
BM						
Dep. Inst.	0.81	1.58	1.92	1.39	1.32	1.17
Non-Dep.Cr.Inst.	N/A	1.99	1.62	1.06	3.48	2.35
TFVA ps						
Dep. Inst.	14.01	25.48	27.57	29.90	36.18	33.61
Non-Dep.Cr.Inst.	N/A	23.71	38.56	35.62	42.43	43.20
TFVL ps						
Dep. Inst.	4.46	0.32	0.26	0.27	2.62	0.38
Non-Dep.Cr.Inst.	N/A	5.63	27.38	22.13	29.35	25.45
EPS						
Dep. Inst.	0.22	-0.10	-0.20	0.09	0.21	0.31
Non-Dep.Cr.Inst.	N/A	-0.46	0.37	-0.09	0.20	0.45
NFVA1						
Dep. Inst.	2.79	2.99	1.57	1.83	1.65	1.15
Non-Dep.Cr.Inst.	N/A	1.44	0.50	1.34	0.90	1.17
NFVA2						
Dep. Inst.	6.41	21.49	25.00	27.12	31.27	31.57
Non-Dep.Cr.Inst.	N/A	6.75	4.48	5.69	6.20	7.54
NFVA3						
Dep. Inst.	0.35	0.68	0.75	0.68	0.63	0.51
Non-Dep.Cr.Inst.	N/A	9.89	6.20	6.46	5.97	9.04
NNFVA						
Dep. Inst.	1.75	-10.05	-13.51	-14.55	-17.44	-17.33
Non-Dep.Cr.Inst.	N/A	-4.58	-0.06	-1.76	-2.54	-5.24

Table A 13: Correlation matrix for variables based on values for 2003-2012

Pearson\Spearman correlation	Price	BVEQ	E	TA	TL	BM
Price		0,651	0,785	0,525	0,510	-0,597
BVEQ*	0,839		0,579	0,772	0,741	0,114
E	0,641	0,685		0,508	0,497	-0,415
TA	0,756	0,908	0,570		0,999	0,081
TL	0,744	0,893	0,556	0,999		0,071
BM	-0,047	0,027	-0,056	0,029	0,029	

Table A 14: Correlation matrix for variables based on values for 2007-2012

Pearson\Spearman correlation	Price	BVEQ	E	BM	FVA	FVL	NFVA	NFVA1	NFVA2	NFVA3	NNFVA
Price		0,747	0,721	(-0,612)	0,391	0,167	0,398	0,194	0,378	0,040	(-0,148)
BVEQ*	0,759		0,568	(-0,044)	0,539	0,116	0,551	0,168	0,511	0,081	(-0,216)
E	0,485	0,441		(-0,427)	0,371	0,140	0,368	0,129	0,354	0,019	(-0,196)
BM	(-0,079)	0,016	(-0,129)		(-0,010)	(-0,122)	(-0,001)	(-0,108)	(-0,009)	0,025	0,005
FVA	0,418	0,553	0,252	0,001		0,132	0,981	0,167	0,935	0,197	(-0,887)
FVL	0,004	0,020	0,018	(-0,005)	0,692		0,079	0,119	0,071	0,172	(-0,036)
NFVA	0,573	0,746	0,331	0,007	0,779	0,085		0,169	0,951	0,211	(-0,902)
NFVA1	0,225	0,365	0,089	(-0,002)	0,362	0,059	0,448		0,064	0,125	(-0,119)
NFVA2	0,570	0,690	0,341	(-0,007)	0,678	0,069	0,875	0,042		0,131	(-0,872)
NFVA3	0,050	0,123	0,054	0,049	0,292	0,018	0,386	0,075	0,118		(-0,183)
NNFVA	(-0,289)	(-0,368)	(-0,166)	0,002	(-0,715)	(-0,106)	(-0,894)	(-0,380)	(-0,756)	(-0,456)	

Table A 15: Relevance of earnings and net assets for the period 2003-2012

$$P_{it} = \alpha_0 + \alpha_1 EPS_{i,t} + \alpha_2 BVEQ_{i,t}$$

EPS	18.920***
	(0.052)
BVEQ	0.646***
	(0.003)
Constant	4.475***
	(0.055)
Observations	28346
Adjusted R-squared	0.94
Standard errors in parentheses	
* p<0.05, ** p<0.01, *** p<0.001	

Table A 16: Comparison of the relevance of earnings and net assets before and after 2008

$$P_{it} = \alpha_0 + \alpha_1 D + \alpha_2 EPS_{i,t} + \alpha_3 EPS_{i,t} D + \alpha_4 BVEQ_{i,t} + \alpha_5 BVEQ_{i,t} D$$

EPS	26.990***
	(0.100)
EPS*D	-25.020***
	(0.106)
BVEQ	0.593***
	(0.004)
BVEQPS*D	0.236***
	(0.005)
D	-4.526***
	(0.082)
Constant	5.131***
	(0.057)
Observations	28349
Adjusted R-squared	0.96
Standard errors in parentheses	
* p<0.05, ** p<0.01, *** p<0.001	

Table A 17: Pricing of net fair value assets

$$P_{it} = \alpha_0 + \alpha_1 EPS_{i,t} + \alpha_2 NNFVA_{i,t} + \alpha_3 NFVA1_{i,t} + \alpha_4 NFVA2_{i,t} + \alpha_5 NFVA3_{i,t}$$

EPS	1.662***
	(0.048)
NNFVA	0.759***
	(0.004)
NFVA1	0.783***
	(0.005)
NFVA2	0.782***
	(0.003)
NFVA3	0.713***
	(0.006)
Constant	0.743***
	(0.067)
Observations	8945
Adjusted R-squared	0.92
Standard errors in parentheses	
* p<0.05, ** p<0.01, *** p<0.001	

Coefficient comparison	F-stat	P-value
Test of NFVA1=NFVA2	0.02	0.88
Test of NFVA1=NFVA3	120.08	0.00
Test of NFVA2=NFVA3	196.07	0.00
Test of NNFVA=NFVA1	29.66	0.00
Test of NNFVA=NFVA2	122.60	0.00
Test of NNFVA=NFVA3	114.02	0.00

Table A 18: Pricing of Net Fair Value Assets over the years

$$P_{it} = \alpha_0 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + \alpha_{10} EPS_{i,t} + \alpha_{11} EPS_{i,t} D_1 + \alpha_{12} EPS_{i,t} D_2 + \alpha_{13} EPS_{i,t} D_3 + \alpha_{14} EPS_{i,t} D_4 + \alpha_{20} NNFVA_{i,t} + \alpha_{21} NNFVA_{i,t} D_1 + \alpha_{22} NNFVA_{i,t} D_2 + \alpha_{23} NNFVA_{i,t} D_3 + \alpha_{24} NNFVA_{i,t} D_4 + \alpha_{30} NFVA1_{i,t} + \alpha_{31} NFVA1_{i,t} D_1 + \alpha_{32} NFVA1_{i,t} D_2 + \alpha_{33} NFVA1_{i,t} D_3 + \alpha_{34} NFVA1_{i,t} D_4 + \alpha_{40} NFVA2_{i,t} + \alpha_{41} NFVA2_{i,t} D_1 + \alpha_{42} NFVA2_{i,t} D_2 + \alpha_{43} NFVA2_{i,t} D_3 + \alpha_{44} NFVA2_{i,t} D_4 + \alpha_{50} NFVA3_{i,t} + \alpha_{51} NFVA3_{i,t} D_1 + \alpha_{52} NFVA3_{i,t} D_2 + \alpha_{53} NFVA3_{i,t} D_3 + \alpha_{54} NFVA3_{i,t} D_4$$

EPS	1.974***
	(0.0809)
EPS*D1	-0.820***
	(0.114)
EPS*D2	-0.515***
	(0.156)
EPS*D3	0.442*
	(0.173)
EPS*D4	1.725***
	(0.235)
NNFVA	0.502***
	(0.0110)
NNFVA*D1	0.102***
	(0.0152)
NNFVA*D2	0.295***
	(0.0145)
NNFVA*D3	0.304***
	(0.0132)
NNFVA*D4	0.344***
	(0.0149)
NFVA1	0.531***
	(0.0108)
NFVA1*D1	0.057***
	(0.0161)
NFVA1*D2	0.412***
	(0.0143)
NFVA1*D3	0.282***
	(0.0147)
NFVA1*D4	0.298***
	(0.0326)
NFVA2	0.603***
	(0.00862)
NFVA2*D1	0.040***
	(0.0119)
NFVA2*D2	0.208***
	(0.0113)
NFVA2*D3	0.202***
	(0.0104)
NFVA2*D4	0.237***
	(0.0117)
NFVA3	0.463***
	(0.0172)
NFVA3*D1	0.117***
	(0.0223)
NFVA3*D2	0.253***
	(0.0211)
NFVA3*D3	0.277***
	(0.0370)
NFVA3*D4	0.368***
	(0.0358)
D1	-1.586***
	(0.230)
D2	-2.332***
	(0.224)
D3	-2.477***
	(0.218)
D4	-2.387***
	(0.232)
Constant	2.835***
	(0.172)
Observations	8893
Adjusted R-squared	0.93
Standard errors in parentheses	
* p<0.05, ** p<0.01, *** p<0.001	

Table A 19: Pricing of net fair value assets with a control variable for size

$$P_{it} = \alpha_0 + \alpha_{11}EPS_{i,t} + \alpha_{12}NNFVA_{i,t} + \alpha_{13}NFVA1_{i,t} + \alpha_{14}NFVA2_{i,t} + \alpha_{15}NFVA3_{i,t} + \alpha_{20}D + \alpha_{21}EPS_{i,t}D + \alpha_{22}NNFVA_{i,t}D + \alpha_{23}NFVA1_{i,t}D + \alpha_{24}NFVA2_{i,t}D + \alpha_{25}NFVA3_{i,t}D$$

EPS	0.739***
	(0.051)
NNFVA	0.627***
	(0.004)
NFVA1	0.596***
	(0.013)
NFVA2	0.640***
	(0.003)
NFVA3	0.613***
	(0.009)
EPS*D	5.328***
	(0.085)
NNFVA*D	0.080***
	(0.006)
NFVA1*D	0.215***
	(0.014)
NFVA2*D	0.105***
	(0.005)
NFVA3*D	0.005***
	(0.011)
D	2.780***
	(0.109)
Constant	0.165***
	(0.077)
Observations	8919
Adjusted R-squared	0.96
Standard errors in parentheses	
* p<0.05, ** p<0.01, *** p<0.001	

Table A 20: Pricing of net fair value assets with a control variable for capital ratio

$$P_{it} = \alpha_0 + \alpha_{11}EPS_{i,t} + \alpha_{12}NNFVA_{i,t} + \alpha_{13}NFVA1_{i,t} + \alpha_{14}NFVA2_{i,t} + \alpha_{15}NFVA3_{i,t} + \alpha_{20}D + \alpha_{21}EPS_{i,t}D + \alpha_{22}NNFVA_{i,t}D + \alpha_{23}NFVA1_{i,t}D + \alpha_{24}NFVA2_{i,t}D + \alpha_{25}NFVA3_{i,t}D$$

	Results without Cap R	Results with Cap R as dummy
EPS	1.523***	1.117***
	(0.056)	(0.061)
NNFVA	0.811***	0.718***
	(0.005)	(0.010)
NFVA1	0.815***	0.691***
	(0.005)	(0.017)
NFVA2	0.831***	0.727***
	(0.004)	(0.008)
NFVA3	0.715***	0.658***
	(0.019)	(0.024)
EPS*D		3.181***
		(0.151)
NNFVA*D		0.144***
		(0.011)
NFVA1*D		0.227***
		(0.018)
NFVA2*D		0.143***
		(0.009)
NFVA3*D		0.011
		(0.034)
D		-0.707***
		(0.162)
Constant	0.070	0.247**
	(0.075)	(0.077)
Observations	7611	7610
Adjusted R-squared	0.92	0.94
Standard errors in parentheses		
* p<0.05, ** p<0.01, *** p<0.001		

Table A 21: Pricing of net fair value assets with a control variable for credit rating

$$P_{it} = \alpha_0 + \alpha_{11}EPS_{i,t} + \alpha_{12}NNFVA_{i,t} + \alpha_{13}NFVA1_{i,t} + \alpha_{14}NFVA2_{i,t} + \alpha_{15}NFVA3_{i,t} + \alpha_{20}D + \alpha_{21}EPS_{i,t}D + \alpha_{22}NNFVA_{i,t}D + \alpha_{23}NFVA1_{i,t}D + \alpha_{24}NFVA2_{i,t}D + \alpha_{25}NFVA3_{i,t}D$$

	Results without a CR	Results with CR
EPS	1.696***	0.710***
	(0.063)	(0.066)
NNFVA	0.797***	0.484***
	(0.009)	(0.015)
NFVA1	0.821***	0.459***
	(0.007)	(0.020)
NFVA2	0.821***	0.506***
	(0.008)	(0.014)
NFVA3	0.746***	0.470***
	(0.010)	(0.015)
EPS*D		8.022***
		(0.133)
NNFVA*D		0.207***
		(0.018)
NFVA1*D		0.369***
		(0.021)
NFVA2*D		0.195***
		(0.017)
NFVA3*D		0.101***
		(0.024)
D		0.959***
		(0.236)
Constant	0.455***	1.291***
	(0.130)	(0.170)
Observations	5689	5687
Adjusted R-squared	0.78	0.88
Standard errors in parentheses		
* p<0.05, ** p<0.01, *** p<0.001		

Table A 22: Pricing of net fair value assets with a control variable for Non-depository credit institutions vs Depository institutions

$$P_{it} = \alpha_0 + \alpha_{11}EPS_{i,t} + \alpha_{12}NNFVA_{i,t} + \alpha_{13}NFVA1_{i,t} + \alpha_{14}NFVA2_{i,t} + \alpha_{15}NFVA3_{i,t} +$$

$$\alpha_{20}D + \alpha_{21}EPS_{i,t}D + \alpha_{22}NNFVA_{i,t}D + \alpha_{23}NFVA1_{i,t}D + \alpha_{24}NFVA2_{i,t}D + \alpha_{25}NFVA3_{i,t}D$$

EPS	1.142***
	(0.099)
NNFVA	0.600***
	(0.016)
NFVA1	0.470***
	(0.049)
NFVA2	0.661***
	(0.017)
NFVA3	0.576***
	(0.017)
EPS*D	0.571***
	(0.113)
NNFVA*D	0.181***
	(0.017)
NFVA1*D	0.332***
	(0.049)
NFVA2*D	0.140***
	(0.018)
NFVA3*D	0.116***
	(0.026)
D	-1.817***
	(0.283)
Constant	2.353***
	(0.275)
Observations	8945
Adjusted R-squared	0.93
Standard errors in parentheses	
* p<0.05, ** p<0.01, *** p<0.001	

Coefficient comparison	F-stat	P-value
Test of NFVA1=NFVA2	15.97	0.00
Test of NFVA1=NFVA3	4.61	0.03
Test of NFVA2=NFVA3	31.83	0.00
Test of NNFVA=NFVA1	8.54	0.00
Test of NNFVA=NFVA2	25.94	0.00
Test of NNFVA=NFVA3	11.95	0.00

Table A23: Price changes and changes in net assets 2003-2012 (I) and 2007-2012 (II)

$$\partial P_{i,t} = \alpha_0 + \alpha_2 \partial EPS_{i,t} + \partial BVEQ_{i,t} + \varepsilon_{i,t}$$

$$\partial P_{it} = \alpha_0 + \alpha_1 \partial EPS_{i,t} + \alpha_2 \partial NNFVA_{i,t} + \alpha_3 \partial NFVA1_{i,t} + \alpha_4 \partial NFVA2_{i,t} + \alpha_5 \partial NFVA3_{i,t} + \varepsilon_{i,t}$$

	(I)	(II)
EPS	0.093***	0.0927***
	(0.0138)	(0.0162)
∂ BVEQ	0.202***	
	(0.0067)	
∂ NNFVA		0.164***
		(0.0105)
∂ NFVA1		0.175***
		(0.0113)
∂ NFVA2		0.160***
		(0.0101)
∂ NFVA3		0.158***
		(0.0120)
Constant	- 0.00634	0.0479*
	(0.0307)	(0.0187)
Observations	27185	8161
Adjusted R-squared	0.041	0.047
Standard errors in parentheses		
* p<0.05, ** p<0.01, *** p<0.001		