Value Relevance of Fair Value Accounting under SFAS No. 157, an Increase of the Scope to Non-Financial Industries.

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Supervisor: drs. R. van der Wal RA
Student: Rianne P. Tetteroo
Studentnumber: 354210
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Abstract.

This research focuses on the value relevance of fair value accounting in the main non-financial industries of the United States. After the implementation of Statement No. 157 by the FASB, companies are required to disclose the total amounts of their fair value estimates categorized by their observability, using Level hierarchy. Previous literature examined the value relevance of these Levels for the financial industry and found significant relevance of these fair value Levels. For non-financial industries this research has not been conducted yet, even though the use of fair value accounting has increased substantially in these industries. I find that all fair value Levels are value relevant to investors for the non-financial industries, except Level 3 liabilities. The financial crisis of 2008 intensified the debate surrounding fair value accounting. However, I find that the crisis only has a short-term negative effect on the value relevance of fair value Levels.

Key words: fair value accounting, value relevance, non-financial industries

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Chapter 1 Introduction

1.1 Introduction

In previous years, the use of fair value accounting has increased and both the FASB and the IASB prefer the use of fair value accounting over more conservative accounting methods (Caprio, 2013; Khurana and Kim, 2003). In 2006, the FASB implemented a Statement regarding the use of fair value; *Statement No. 157 "Fair Value Measurement",* which became effective as of the fiscal year starting November 15, 2007 (FASB, 2006). The IASB followed in 2011 with *IFRS 13 "Fair Value Measurement"* (IASB, 2011).

Nevertheless, there is still much debate regarding the use of fair value accounting, especially after the financial crisis. Opponents (ABA, 2008; Wallison, 2008; Whalen, 2008) argue that fair value accounting contributed to the financial crisis of 2008 because it caused massive write-downs of assets due to lower market prices. Because of the low reliability of fair value estimates, the use of historical cost is preferred. However, proponents (Pozen, 2009; Laux and Leuz, 2010; Badertscher, Burks and Easton, 2012) argue that fair value accounting increases the relevance of financial statements, because it shows the actual market value of an asset or liability instead of the outdated historical cost. If market value is unavailable, fair value estimates are based on managements' assessment which therefore reflect inside knowledge of management (Hitz, 2007). Fair value accounting did therefore not cause the financial crisis, but only showed the current state of the economy. With this research, I want to examine whether fair value accounting is indeed the better choice for the FASB and the IASB by examining the value relevance of fair value accounting to investors.

1.2 Research question and sub questions

Whether fair value accounting is useful to investors when assessing the value of a company, is mostly examined for the financial industry. However, little research is conducted on the effects for non-financial industries, even though these industries also have the option to use fair value accounting in financial statements. This research is focused on the value relevance of fair value accounting in the main non-financial U.S. industries. The effects for non-financial industries are not largely examined, even though the use of fair value accounting has increased in these industries as well (Hitz, 2007; Ramanna, 2013). The main research question of this paper is therefore as follows:

Are all levels of fair value estimates under SFAS 157 value relevant to investors for the non-financial industries?

In order to answer this research question, it is important to distinguish results between the different industries, because the relevance of fair value accounting to investors can be dependent on the type of industry. Therefore the following sub-question will be answered:

Is the value relevance of fair value accounting dependent on the industry?

Besides the distinction in industry, it is relevant to examine the distinction over time. Bad economic times could have a different impact on the usefulness of fair value accounting to investors than good economic times. During the 2008 financial crisis, markets became illiquid and observable market prices were harder to find. This caused fair value estimates to become more subjective, which could lower the value relevance of fair value accounting in bad economic times (Laux and Leuz, 2010). However, fair value accounting reflects the actual value of a company, which is indeed much lower in times of crisis (Magnan, 2009). Fair value would thus still be the most relevant accounting method in bad economic times. Because of this debate, I formulated the following sub-question:

Did the 2008 financial crisis have an impact on the value relevance of fair value accounting?

1.3 Relevance of the subject

The results are relevant to standard setters in the first place, because it assesses the relevance of existing standards regarding fair value accounting and it can be used as a basis for future standards. Besides that, the results will show the effectiveness of existing standards in non-financial U.S. industries, instead of only the financial industry. Second, the results are relevant to financial statement preparers and users, because it will suggest whether the benefits of fair value accounting exceed the costs. The benefits of fair value accounting can be described as increased relevance to investors and other stakeholders, because fair value better captures the actual value of a company than the more outdated historical cost of a balance sheet item. The costs are the actual costs of estimating the fair value of a balance sheet item and the information asymmetry between management and other stakeholders when estimation of fair value depends on management's judgement (Benston, 2008; Landsman, 2007).

1.4 Contribution of the paper

The contribution of this research to prior research is first the focus on other industries. I will add new information regarding non-financial industries. This approach increases the external validity because a wider set of different industries and companies is being examined, which all have different characteristics. Second, I will show the effects of the financial crisis on the value relevance of fair value accounting as perceived by investors. Prior research on this topic is mainly focused on the actual effects of fair value on the crisis, instead of the perception of investors. Finally, I extended the most often used regression in prior literature with existing and new control variables to eliminate to the best extend the probability of omitted variables, creating a more complete model.

I will examine the association between share price and fair value estimate categories for the main non-financial industries in the U.S. according to the Global Industry Classification Standard (GICS). These industries can be categorized as follows: energy (10), materials (15), industrials (20), consumer products (25 and 30), health care (35), IT (45), telecommunication (50), and utilities (55). Industry code 40 is omitted from this research, because this is the financial sector.

1.5 Findings and implications

All asset Levels and Level 1 & 2 liabilities are value relevant at the one percent level. Level 3 liabilities however, are not value relevant to investors. This can be caused by the low frequency of non-zero Level 3 liabilities in the sample. Due to this low frequency, investors could perceive Level 3 liabilities as not important and therefore not value relevant.

The value relevance of Level 3 assets is significant, but reversed. Investors respond to these assets as if they are decrease firm value. The share price decreases when companies report Level 3 assets. This can be due to the low frequency of Level 3 assets in the sample, or investors have no trust in management's judgement regarding fair value assets that they perceive them as firm value decreasing.

For both assets and liabilities, the value relevance of Level 3 is less than the value relevance of Level 1. Investors perceive Level 1 fair values as more value relevant than Level 3 fair values. The value relevance is dependent on the industry, which answers sub-question one.

Second, the effects of the crisis are examined. The value relevance of both Level 1 assets and liabilities increases after the crisis. This indicates that investors discount Level 1 fair value during the crisis. The value relevance of Level 3 assets and liabilities also increases after the crisis, but this effect only holds for one year. This indicates that investors discount Level 3 fair value during the crisis, increase their trust shortly after the crisis, but lose this trust in Level 3 after one year.

The amendment to Level 3 disclosure, ASU No. 2010-06 became effective in 2010. The results show a short term effect of this amendment. For assets, the increasing difference in value relevance between Level 1 and 3 slows down one year after the implementation of this amendment. For liabilities, this difference even decreases for one year. Investors therefore increase their trust in Level 3 fair value for one year, which causes the difference in value relevance to decrease, but this effect only holds for one year.

1.6 Thesis outline

The remainder of this thesis is structured as follows. Chapter 2 discusses the main concepts and relevant prior literature. Chapter 3 the hypotheses development, research design and sample selection process. Chapter 4 discusses the descriptive statistics, OLS assumptions and the main results for sub questions one and two. Chapter 5 consist of the conclusion, which answers the research question, discusses limitations and avenues for further research.

Chapter 2 Relevant concepts and literature review

2.1 Introduction

Subsection 2.2 first discusses relevant concepts and the theory used in this thesis. In subsection 2.2.1 value relevance will be discussed, in 2.2.2 fair value accounting and in 2.2.3 the agency theory. Second, subsection 2.3 discusses prior literature regarding the value relevance of fair value accounting. Finally, in subsection 2.4 a short summary and conclusion of chapter 2 will be provided.

2.2 Concepts

2.2.1 Value relevance

This research examines the value relevance of fair value accounting under SFAS 157. Value relevance can be defined as the informativeness of accounting amounts to equity investors (Barth, Beaver and Landsman, 2001).

Prior research (Barth, 1994; Barth, Beaver and Landsman, 1996; Eccher, Ramesh and Thiagajaran, 1996; Nelson, 1996; Simko, 1999) examines the incremental value relevance of fair value accounting. This is defined as the value relevance of fair value accounting as a supplemental disclosure to an already existing disclosure like historical cost accounting. According to this, the value relevance of fair value accounting is defined as the total value relevance minus the value relevance of the historical cost value (Biddle, Seow and Siegel, 1995).

In contrast, Khurana and Kim (2003) examine the relative value relevance of fair value accounting. This is the value relevance of fair value accounting as opposed to historical cost accounting. Here, both accounting methods are seen separately and their total value relevance is compared to each other (Biddle et al., 1995). Relative value relevance therefore compares the value relevance of fair value against historical cost, to assess which method has a higher relevance. Incremental value relevance only assesses whether fair value accounting has any value relevance on top of the already existing disclosure of historical cost.

These two approaches were executable because financial statements recognized historical cost and disclosed the respective fair value, or vice versa. This way, information was available on both the historical cost and fair value amount of one specific balance sheet

item. Researchers could therefore either assess the separate relevance of both methods, or assess the relevance of one method, given the other method. This changed after the implementation of SFAS 157. This disclosure on fair value accounting is only based on fair value accounting, and describes the difference in observability between fair value estimates. It is therefore possible to assess the difference in value relevance for the level of observability of fair value estimates, rather than the value relevance of the total fair value. In this research, I will examine this value relevance of the level of observability, and not the relevance of total fair value.

2.2.2 Fair value accounting

The second main concept in this thesis is fair value accounting. Since the FASB and the IASB strive to more convergence between US GAAP and IFRS, the definition of fair value is similar in both concept statements. The FASB defines fair value as:

"*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*." (FASB, 2011b p.16)

In 2006, the FASB issued Statement No. 157 "Fair Value Measurement" (FASB, 2006).This statement provides the above definition of fair value accounting, methods to measure the fair value and disclosure requirements regarding the use of fair value estimates. This statement is not related to the choice of fair value use, but rather shows how fair value accounting needs to be applied after the choice for fair value accounting is made (FASB, 2006).

The fair value of a balance sheet item is assessed using market inputs like prices, if available. Fair value estimate inputs under both IFRS 13 and the amended SFAS 157 can be divided into three categories, called Levels. Level 1 estimates are prices directly observable in active markets and is therefore the preferred estimate. Level 1 can be classified as marking-to-market accounting, because fair value is estimated using objective market prices. If prices are not available in active markets, fair value items can be estimated using Level 2 estimates. These are prices that are indirectly observable from comparable items in active markets or identical items in non-active markets. If these prices are also not available, fair value estimates are based on Level 3. Prices are unobservable because there is little to no market activity for these assets and liabilities. The estimates are subjective and are generated from

within the firm using models. Level 2 and 3 are therefore classified as marking-to-model, because estimates are not objective but established using subjective prices or models to estimate fair values (FASB, 2011b; IASB, 2011).

The objective of SFAS 157 is that companies need to disclose how the fair values they used on the balance sheet are set, grouped by the observability of the fair value inputs. I will therefore only examine the value relevance of fair value Levels, regardless of their book values. I do this because my focus is on the difference in value relevance between fair value observability Levels and not on the difference between fair value and historical cost accounting, and respective book values of balance sheet items are difficult to obtain from financial statements.

There are four asset categories and two liability categories on the balance sheet, which are either measured at fair value or at historical (amortized) cost. Assets and liabilities at fair value through profit and loss (held for trading) are measured at fair value, their gains and losses are recorded in income (P&L). Available-for-sale assets are also measured at fair value, but gains and losses are recorded under accumulated other comprehensive income on the balance sheet, until disposed of. Loans and receivables, held-to-maturity assets and other liabilities are measured at amortized cost (Whittington, 2015). The total amount of fair value assets and liabilities per Level needs to be disclosed in the financial statement, for an example see Appendix 1.

As mentioned, the FASB and the IASB strive for more convergence between US GAAP and IFRS. For this reason, the IASB issued IFRS 13 "*Fair Value Measurement*", effective since January 1, 2013 (IABS, 2011). As a response, the FASB made an amendment to SFAS 157 to increase the alignment with IFRS 13 (FASB, 2011a). The focus of this amendment is on more disclosure requirements on fair value accounting, especially for Level 3 fair value, but does not change the original statement substantially.

2.2.3 Agency theory

This thesis is based on the agency theory. This theory will therefore be explained in this sub section.

The agency theory is based on a contract between a principal and an agent. The principal hires an agent to perform work on their behalf, for example when the shareholders (i.e. the

principal) hire management (i.e. agent) to run the company owned by these shareholders. Because the principal delegated authority to the agent, the agent can hold back information from the principal. This is known as information asymmetry; the agent has more knowledge of the operations of the company than the principal. Withholding information from principals is seen as opportunistic behaviour, and is triggered by the different interests of principals and agents. Principals benefit from the long-term value of a company, while agents benefit more from the short-term value of a company, due to, for example, bonus plans (ICAEW, 2005).

In this thesis, the investors are the principal and management is the agent. Investors can share in the ownership of a company, but do not run the company. They hire management to do that for them. Management can, however, withhold information about the company from investors which reduces the relevance of financial information. In the case of fair value accounting, this has the following implications. As mentioned before, Level 3 estimates are based on management's models, since there is no market price available. If management behaves opportunistically, they can increase the value of the company by changing the fair value of balance sheet items. This leads to information asymmetry between management and investors. Investors do not know the true value of a company, but have to rely on the information provided by management. This can discount the value relevance of these reported fair values. Level 1 fair values are observable in active markets. Investors can easily observe these prices and assess the true value themselves. Therefore, the information asymmetry between investor and management is minimized for Level 1 fair value.

2.3 Prior literature

Value relevance of fair value accounting is a very widely used subject for academic research. New accounting standards changed the structure of research. Before 2007, research was focused on the value relevance of fair value disclosures as mandated by SFAS 107 (Barth, 1994; Barth et al., 1996; Eccher et al., 1996; Nelson, 1996). SFAS 107 mandated the disclosure of fair values of financial instruments for all industries, affective since 1992 (FASB, 1991). In 2007, this Statement was superseded by SFAS 157, mandating the disclosure of the different Levels of fair value estimates (FASB, 2006). With this new standard, the total amounts of fair value per Level became available, which resulted in research that could examine the value relevance of different levels of observability of estimate inputs, instead of

previous research that could only estimate the observability of fair value inputs and were usually focused on the difference between fair value and historical cost (Kolev, 2008; Song, Thomas and Yi, 2010; Goh, Li, Ng and Yong, 2015).

Results regarding the value relevance of fair value disclosure under SFAS No. 107 are mixed. Barth (1994) examined the incremental value relevance of the fair value disclosure of investment securities for the banking industry. Investment securities are relatively reliable compared to other assets and liabilities, because they are usually traded on active markets. The estimated observability of investment security prices is therefore high and could be defined as marking-to-market fair value. The results of this research show the significant value relevance of fair value investment securities above their respective book values, which indicates the substantial value relevance of marking-to-market fair value items to investors (Barth, 1994).

Other research examined the value relevance of more balance sheet items for the financial industry, like securities, loans, deposits, long-term debt and off-balance sheet items. The main focus of these researches is on securities and loans, because the observability of fair value inputs for securities is relatively high and that of loans is relatively low. The observability of the other items is somewhere in between securities and loans and therefore not the main focus. Loans are usually not traded on active markets, which limits the observability of market prices (Barth et al., 1996; Eccher et al., 1996). The fair value of loans needs to be estimated using models and can therefore be classified as marking-to-model.

The fair value disclosure of investment securities has significant value relevance over their respective book values, in accordance with Barth (1994) (Barth et al., 1996; Eccher et al., 1996). Surprisingly, the fair value disclosure of loans also has significant value relevance over their respective book values. This suggests that even marking-to-model fair values are value relevant to investors, even though these fair value types are prone to relatively higher error or manipulation by management than observable fair value inputs (Barth et al., 1996; Eccher et al., 1996).

However, other research contradicts these findings. Nelson (1996) also examines the incremental value relevance of fair value disclosures for mainly securities and loans in the banking industry. The only item with significant value relevance are investment securities.

Unobservable fair values of loans are not value relevant to investors, according to this research. After controlling for company growth, the value relevance of investment securities is also eliminated (Nelson, 1996). This research suggests that fair value disclosures are not relevant to investors, indicating that the cost of establishing fair values exceeds the benefit of more value relevance to investors.

Khurana and Kim (2003) use relative value relevance to test their research question, instead of incremental value relevance. They examine the value relevance of fair value disclosure in comparison to historical cost disclosure. The value relevance of fair value accounting is higher than historical cost accounting for securities, suggesting that the observable fair values are more value relevant than the outdated historical cost values. However, for loans, the historical cost is more value relevant than the fair value. This result suggest that, when fair value inputs become less observable and are prone to subjectivity by management, investors prefer historical cost over fair value accounting. This also contradicts the view that all fair value disclosures are value relevant, regardless of the observability or subjectivity of fair value inputs.

In 2007, SFAS 157 was implemented. This statement divides fair value balance sheet items into categories of estimate input observability. This makes it easier and more objective to distinguish the observability of estimate inputs. Previous research estimated the level of observability of fair value inputs, because these levels were not disclosed in financial statements. Recent research has this information available and can use the Level distinction to examine the value relevance of different categories of subjectivity of estimate inputs.

Post-2007 research (Kolev, 2008; Song et al., 2010; Goh et al., 2015) concludes that all three Level estimates are value relevant for the financial industry, which can be compared to the findings of Barth et al. (1996) and Eccher et al. (1996). The value relevance of Level 1 fair value, however, is larger than the value relevance of Level 3 fair value, indicating that more subjectivity of fair value estimates is indeed a concern to investors, because they discount subjective, Level 3, fair value estimates compared to objective, Level 1 estimates (Kolev, 2008; Song et al., 2010; Goh et al., 2015).

Prior research is mainly focused on the banking industry, because for this industry more balance sheet items are valued at fair value and disclosures are more complete. The limited

research that is available for non-financial industries, is conducted prior to SFAS 157. Simko (1999) examined the incremental value relevance of financial instrument assets and liabilities and derivative instruments for non-financial companies. He only found significant value relevance for liabilities. The lack of value relevance of fair value assets and derivatives is mainly caused by the limited economic significance; most non-financial companies report mainly fair value liabilities and not assets and derivatives. The value relevance of fair value liabilities was found to be significant under some conditions. The difference between fair value and book value needed to be substantial, and the company needed to have a loss position (Simko, 1999). These results indicate that, during that time, fair value was indeed less evolved in non-financial industries, and the value relevance of fair value accounting was limited.

The current importance of fair value accounting in non-financial industries is debated. Kuiper and Ter Hoeven (2013) state that the total amount of balance sheet items valued at fair value is limited for these industries, which is also the case in the research by Simko (1999). On the other hand, Ramanna (2013) states that the use of fair value accounting is increasing. Accounting standard setters like the FASB and IASB shifted their preference from a more conservative approach to the use of fair value accounting, which indicates the growing importance of fair value accounting in both financial and non-financial industries (Caprio, 2013; Khurana et al., 2003). The results of Simko (1999) could therefore be outdated, because non-financial industries increased their use of fair value accounting. Re-assessing the value relevance of fair value accounting in non-financial industries under current conditions is therefore an interesting research.

2.4 Summary and conclusion

The main concepts used in this paper are value relevance and fair value accounting. Value relevance is defined as the informativeness of accounting amounts to equity investors (Barth et al., 2001). Fair value is defined as the true market value of an asset or liability, which can be measured as the selling price of an asset or the transfer price of a liability (FASB, 2011b). Fair value estimates under SFAS 157 are divided into three Levels. Level 1 are observable prices on active markets, as mentioned in the definition of fair value of the FASB. Level 2 are estimates based on indirectly observable prices from comparable items in active markets, or identical items in non-active markets. Level 3 are based on models made by the company

and therefore highly subjective. This thesis will compare the value relevance of these three Levels of fair value estimates, to assess whether fair value estimates are of value to investors.

The main theory this research is built upon is the agency theory. According to the agency theory, investors are the principal, who hire management to be the agent. Because management has inside knowledge which they can withhold from investors, information asymmetry is created. Especially Level 3 fair value is prone to information asymmetry, and could therefore be less value relevant than Level 1.

SFAS 157 was implemented in 2007. Therefore, articles post-2007 are the most valuable for this thesis. Most research conducted post-2007 (Kolev, 2008; Song et al., 2010; Goh et al., 2015) is focused on the financial industry. These articles conclude that all three Levels of fair value estimates are value relevant, however Level 1 estimates are more value relevant than Level 3 estimates. Post-2007 research on non-financial industries is limited. Kuiper and Ter Hoeven (2013) conclude that the use of fair value is limited for non-financial industries. However, Ramanna (2013) concludes that this use of fair value accounting is increasing for non-financial industries. The FASB and IASB also prefer the use of fair value accounting nowadays. Due to this growing attention to fair value accounting in non-financial industries, I will examine the effects of fair value estimates for investors in all major non-financial industries of the U.S. A summary table of prior literature is added in Appendix 2.

Chapter 3 Hypotheses development, sample selection and research design

3.1 Introduction

Subsection 3.2 will first describe the hypotheses development. Hypothesis 1a and 1b will help to answer sub question 1 regarding the different U.S. industries, and is described in subsection 3.2.1. Hypotheses 2a and 2b will help to answer sub question 2 regarding the change in value relevance over time, and is discussed in subsection 3.2.2. Second, subsection 3.3 will describe the sample selection process and subsection 3.4 will describe the research design including the main model used in this thesis. Chapter 3 finishes with a summary and conclusion of the hypothesis development, sample selection process, and research design.

3.2 Hypotheses development.

3.2.1 Hypothesis development for sub question 1

With this research, I want to examine the value relevance of the three Levels of fair value estimates as mandated by SFAS 157, for non-financial industries. Prior research, as mentioned in Section 2.3, shows that all three Levels of fair value estimates for the financial industry are value relevant to investors, but Level 1 estimates are preferred over Level 3 estimates. The value relevance of fair value Levels for non-financial industries are not yet examined in prior post-2007 research, which is why I will examine this possible association in my thesis.

The difference in value relevance between Levels can be explained using the agency theory. According to the agency theory, information asymmetry can exist between the principal and the agent. In the case of fair value accounting, the investors are the principal and management is the agent. Information asymmetry can arise when management has the freedom to assess fair values. Level 1 estimates are observable market prices and can therefore not be assessed by management. They have to use the available market prices for the fair value measurement. Since these Level 1 estimates are directly observable in active markets, they are easily observable by investors, which eliminates the information asymmetry between management and investors on the estimation of the fair value.

I assume the efficient market theory to hold in this thesis following prior literature and for simplicity reasons. The efficient market hypothesis assumes markets to be efficient, which is

defined as a capital market that *"fully and correctly reflects all relevant information in determining security prices"* (Malkiel, 1991). In reality, markets never completely and fully reflect all the information necessary to determine security prices, and therefore information asymmetry will always be an issue (Wilkinson and Klaes 2012).

Level 3 estimates are subject to management's judgement because there are no observable market prices available. Because these prices are not directly observable but are estimated by a model used by management, Level 3 estimates are exposed to estimation error or manipulation by management (Landsman, 2007). Investors will therefore discount the value relevance of Level 3, because information asymmetry exists between management and investors regarding the estimation inputs for fair values.

Assuming the information perspective of accounting numbers, Level 3 fair values can still be of some relevance to investors. The information perspective states that accounting information can add value by reflecting (inside) information rather than just show the objective value of an item (Hitz, 2007). Because Level 3 is based on inside information and not on objective market prices, these fair values can reflect management's beliefs and expectations regarding future performance (Hitz, 2007). Level 3 fair values thus reflect inside information, which is useful to investors in valuing a company.

I expect all Levels of fair value estimates to be value relevant to investors according to the information perspective, but Level 1 to be more relevant than Level 3 due to information asymmetry between investors and management in assessing Level 3 estimates. This results in the following hypotheses:

H1a: All three estimate Levels under SFAS 157 are value relevant to investors for non-financial industries.

H1b: Level 3 fair values are less value relevant than Level 1 fair values.

3.2.2 Hypothesis development for sub question 2

With the financial crisis of 2008, the debate surrounding fair value accounting erupted again. Opponents blame fair value accounting for worsening the financial crisis. Asset prices were decreasing rapidly due to increasing inactivity in asset markets. This caused a decrease of the value of fair value assets, which caused solvency problems for the financial sector (Bout, ter Hoeven and Langendijk, 2010; Laux et al., 2009; Pozen, 2009). Due to the decreasing prices,

banks started selling their financial instrument assets which were valued at fair value, which magnified the collapse of markets even further (Magnan, 2009). Market prices no longer reliably reflect the underlying value, but rather show a disproportionately low market value. This could discount the value relevance of fair value accounting in times of a crisis, because prices are no longer a reliable measure of firm value. This results in lower value relevance of Level 1 (and 2) fair value estimates during the crisis and an increase in value relevance post-crisis, because the unreliable market prices are the input for Level 1 (and 2) fair value.

However, financial statement users supported the use of fair value accounting during the financial crisis because it improves the transparency of investments and the comparability across companies (SEC, 2008). Laux et al. (2010) even argue that historical costs decreases transparency, which worsens the crisis rather than fair value accounting worsening the crisis. Proponents argue that fair value accounting shows the actual value of a balance sheet item and is thus only a messenger of lower firm value during a crisis, instead of fair value being the cause of the crisis (Magnan, 2009). This implies that the value relevance of Level 1 fair values would not decrease in times of a crisis, because it only continues to show the actual firm value. I assume this theory to hold, because financial statement users are proponents of fair value accounting, and this research examines the value relevance to some of these users; investors. During bad economic times, the value relevance of Level 1 fair value will thus remain unchanged compared to the post-crisis period, because it still reflects actual firm value.

During the crisis markets became inactive, which led to input prices for Level 1 (and 2) estimates to become less available, leaving the use of Level 3 fair value to increase during the crisis (Laux et al., 2010). Level 3 estimates, and Level 2 to a lesser extent, are subject to management discretion, making it easier for management to manipulate accounting numbers than Level 1 fair values. Especially in times of crisis, investors worry about the misrepresentation of accounting numbers (Laux et al., 2010; Magnan, 2009). During a crisis, the use of subjective Level 3 fair value increases, which leads to more manipulation concerns. The value relevance of Level 3 fair value could therefore be lower during bad economic times than during better economic times.

As a result of the crisis, the FASB issued an amendment to the fair value statement in 2010, ASU No. 2010-06 "*Improving Disclosures about Fair Value Measurements"*, in order to

improve the disclosures regarding subjective fair value accounting to restore investors' confidence (FASB, 2010). Goh et al. (2015) argue that, because of this amendment, the value relevance of Level 3 estimates will increase after this amendment. Due to increased disclosure on Level 3 fair value estimates, the information asymmetry between management and investors declines. This helps to strengthen the investor's trust in management and their use of fair value models. Goh et al. (2015) find that even though the overall value relevance of all Levels improved after the crisis, Level 3 value relevance increased the most.

Following this reasoning, I expect the value relevance of Level 1 fair value to remain unchanged during and after the crisis, but the value relevance of level 3 fair value to increase after the crisis. Due to the amendment to SFAS 157, the value relevance of Level 3 increases, leading to the difference between Level 1 and Level 3 fair value to decrease. This leads to the following hypotheses:

H2a: The value relevance of Level 1 fair value remains unchanged, while the value relevance of Level 3 fair value is lower during the 2008 financial crisis than post-crisis.

H2b: The difference between value relevance of Level 1 and Level 3 fair value decreases after the implementation of ASU No. 2010-06.

3.3 Sample selection

The sample period for this research is 2008-2015. The year 2008 is the first full year after the implementation of SFAS 157, and 2015 has the latest available data. I use quarterly filings from public U.S. companies. Information on quarterly share prices and number of shares outstanding is obtained from the CRSP database. All other financial information from 10-Q and 10-K filings is obtained from COMPUSTAT North America Fundamentals Quarterly database. The financial industry is substantially different from non-financial industries, because, following Basel ii and iii (2008 and 2010 respectively), banks have requirements regarding their capital adequacy and market liquidity risk that are not applicable to other industries (Basel iii, 2010). A bank's capital ratio could therefore be correlated with the other variables. For this reason, I exclude the financial sector from the sample (GICS code 40).

After eliminating duplicate observations, observations with missing variables, and observations for t-1 (i.e. year 2007), the total sample consists of 45.885 firm quarter observations. The process of the sample selection can be found in Table 1.

Table 1
Sample Selection

Process	Total
firm-quarter observations from databases	266.798
Less:	
observations with missing price information in the CRSP database	-149.497
observations with missing variables	-71.398
duplicate observations	-2
observations for t-1 (i.e. financial year 2007)	-16
total firm-quarter observations	45.885
total firms in sample	2.787

Table 1 provides the sample selection process. The final sample consists of 2.787 firms, who generate 45.885 firm-quarter observations. The base of the selection is the firm-quarter observations from Compustat North-America Quarterly Database, from years 2007 until 2015.

3.4 Research design

For hypotheses 1, I examine the association between value relevance and the fair value Levels under SFAS 157 for non-financial industries. For hypotheses 2, I examine this relation between value relevance and fair value Levels over time.

To test the value relevance of fair value Levels, I use a model based on Kolev (2008), Song et al. (2010), and Goh et al. (2015). I combine these regressions because they take into account the different fair value Levels instead of single balance sheet items, as used in less recent articles. Kolev (2008) uses the net fair values per Level, but include more control variables, while Song et al. (2010) and Goh et al. (2015) include only net income and non-fair value assets and liabilities as control variables, but split the fair values per Level into assets and liabilities. I amended the models by including materiality as a new control variable, because value relevance could be dependent on the occurrence and magnitude of fair value on the balance sheet.

This results in the following model:

$$PRC = \alpha_0 + \alpha_1 FVA1 + \alpha_2 FVA2 + \alpha_3 FVA3 + \alpha_4 FVL12 + \alpha_5 FVL3 + \quad (1)$$

$$B_1 NFVA + \beta_2 NFVL + \beta_3 NI + \beta_4 MAT + \beta_5 SIZE + \beta_6 GROWTH + \beta_7 IND + \varepsilon$$

In which PRC is the dependent variable which measures the value relevance, and is operationalized as the share price measured one day after the 10-Q or 10-K filing date.

De independent variables are the fair value Levels. FVA1, FVA2 and FVA3 are the total fair value assets under Level 1, 2, and 3 respectively. FVL12, and FVL3 the fair value liabilities under Level 1 plus 2, and 3 respectively. I combined Level 1 and 2 liabilities, because there are not enough observations for Level 1 liabilities, as shown in the descriptive statistics in Table 5. Because I test the difference between Level 1 and 3, I can combine Level 1 and 2 as if it were one variable.

The control variables are the following. NFVA and NFVL are the total non-fair value assets and liabilities respectively. They are included as control variables because they also have an effect on the firm value and share price. They can be measured as the total assets (liabilities) minus the total fair value assets (liabilities). NI is net income before extraordinary items, and is included because profit also has an effect on the firm value and share price. SIZE stands for company size and can be operationalized using lagged total assets divided into deciles. GROWTH stands for future growth and can be operationalized using the percentile change of total assets divided into deciles (Kolev, 2008). The size and growth of a company can also be correlated with the share price, or even the use of fair value accounting in the financial statement, and therefore need to be included in the model. Besides these already existing control variables in prior literature, I include MAT as a proxy for materiality of fair value items. For some companies, fair value is a significant part of the total balance sheet amount, while for others fair value is only a fraction of this total. The magnitude of fair value compared to the balance sheet total can intervene with the level of value relevance, which makes it important to include as a control variable. Materiality can be measured as the total net fair value divided by the total net assets. MAT is a dummy which equals 1 if the percentage fair value is above the sample mean and zero otherwise. Finally, industry dummies are included to control for the different industries. A summary of the variable definitions is shown in Appendix 3.

In this model, all variables are per company (i) and per quarter (t), however these letters are omitted from the above equation for simplicity reasons. All variables are deflated by the number of common shares outstanding, following Barth and Clinch (2009).

In Table 2, the Libby Boxes are presented that show how the constructs of my thesis are operationalized (Libby, 1981).

Table 2: Libby boxes hypotheses 1a, 1b, 2a and 2b:

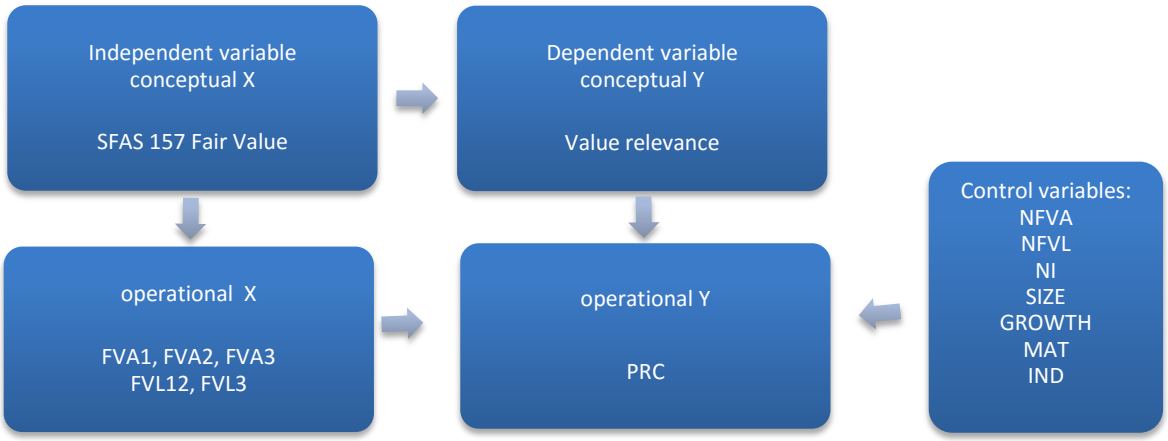


Table 2 presents the Libby Boxes relevant to my thesis. I examine the value relevance to investors of the fair value disclosure under SFAF 157. The dependent variable here is the value relevance and the independent variables are the fair value disclosures. To operationalize, value relevance can be measured using the share price, and the fair value disclosures are operationalized using the total amount of fair value assets and liabilities under each Level, as disclosed in the financial statements. Control variables include non-fair value assets and liabilities, net income, size, growth, materiality, and industry.

The sample only covers the U.S. non-financial industries, which limits the external validity of this thesis. However, the U.S. has the most data available on fair value Levels, since SFAS 157 was implemented in 2007. In Europe, for example, the regulation regarding fair value Level disclosure was only implemented in 2011. For this reason, I chose the U.S. as my sample country.

The operationalization of the independent variables is straightforward, since the fair value disclosure under SFAS 157 can be measured by the disclosure in the quarterly reports of U.S. companies, who are obliged to report under SFAS 157 when reporting fair values. The operationalization therefore measures the underlying construct to a high degree. In other words, the construct validity of the independent variables is sufficient. The dependent variable value relevance is operationalized by the share price one day after the reporting date of the 10-Q. The reaction of investors to this report can indeed be measured using share price, which is also used in previous literature (Kolev, 2008; Song et al., 2010; Goh et al., 2015). However, there are other measures of value relevance, like share return or cumulated abnormal return. I use share price as the dependent variable instead of another

variable, following prior literature (Song et al., 2010; Goh et al., 2015), because I want to measure the effects of fair value disclosure on firm value, instead of in the change of firm value over time. The construct validity of the dependent variable is therefore not as strong as the construct validity of the independent variables, but share price measures value relevance to an acceptable degree.

To maximize the internal validity of my research, I included several control variables to reduce possible alternative explanations for the association between share price and fair value disclosure. These control variables are shown in Table 2 and include non-fair value assets and liabilities, net income, size, growth, materiality, and industry. It is not possible to rule out all possible explanations, but it does reduce this chance to an acceptable level. Since the share price is measured one day after the reporting date of the 10-Q or 10-K filing, the independent variables precedes the dependent variable in time. It is therefore clear that the one, fair value disclosure, causes the other, share price, and not vice versa.

To assess the value relevance of fair value Levels, I will evaluate the coefficients of the independent variables regarding fair value assets and liabilities. Coefficients significantly greater than 0 indicate value relevance. Significance is measured with the t-statistic. For samples larger than 500 observations, the coefficient is significant at the one percent level when the t-statistic is greater than 2.59. T-statistics less than 1.65 are not significant. An F-test will examine the difference between fair value Level estimates to assess the difference in value relevance between Levels (Song et al., 2010; Goh et al., 2015).

For hypothesis two, I divide the sample in two groups, in-crisis (2008) and post-crisis (2009-2015), and I will plot the difference in value relevance per year. This will show the movement of value relevance over time, in order to assess the change in relevance during and after the financial crisis.

3.5 Summary and conclusion

This chapter first discussed the hypotheses development for both sub questions. For sub question one, I will test whether the three fair value Levels are value relevant and if there are differences in the value relevance between the Levels 1 and 3. For the second sub question, I will test whether the financial crisis had an impact on the value relevance. Second, this chapter discussed the sample selection process and the research design

including the main model. In the following chapter, I will discuss descriptive statistics, OLS assumptions, and the results for hypotheses 1 and 2.

Chapter 4 Findings and Analysis

4.1 Introduction

This chapter discusses the data analysis and the results for hypotheses 1 and 2. In subsection 4.2, the assumptions for a BLUE OLS regression are tested. In subsection 4.3, descriptive statistics are described. The findings to the regression analysis are described in subsection 4.4 and 4.5 for hypotheses 1 and 2, respectively. A sensitivity analysis is conducted in subsection 4.6, and this chapter closes with a summary and conclusion in subsection 4.7.

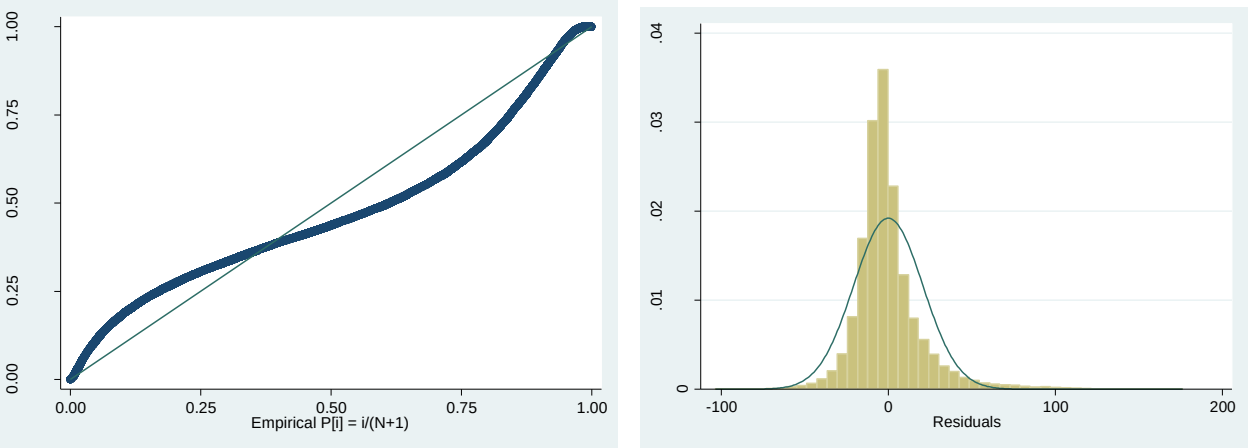
4.2 OLS assumptions

In order for an OLS regression to be BLUE, the best linear unbiased estimator, five assumptions need to be met. These assumptions are the following: normality, homoscedasticity, multicollinearity, linearity, and model specification (Chen et al., 2003).

The first assumption is the normal distribution of residuals. In graph 1, the normal distribution of the residuals is plotted. In order to improve the normal distribution of the residuals, I winsorized all continuous variables in order to amend extreme outliers from the sample. I chose winsorizing over other methods of outlier filtering, because it changes the extreme observations to less extreme observations, it does not eliminate observations from the sample. The standardized normal probability plot in graph 1 shows a deviation from the fitted line, but since the sample is quite large this deviation is acceptable.

The second assumption that needs to be met is homoscedasticity. My original model showed signs of heteroscedasticity. The null hypothesis of the White's test, the variance of residuals is homogenous, is rejected at the 1% level. To correct the heteroscedasticity in the model, I used both a clustered standard error and a robust standard error. Outputs for both standard errors however are identical. By clustering the standard error, the effects of heteroscedasticity are minimized. Following Song et al. (2010) and Goh et al. (2015), clustering the standard errors help to reduce correlation among residuals. I therefore cluster the standard errors in two dimensions: firms and quarters.

Graph 1
Normal distribution residuals



Graph 1 shows the standardized normal probability plot on the left. For perfect normal distribution, the blue line should be equal to the 45^{o} line. However, a small deviation is still acceptable. On the right, the normal distribution of the residuals is presented. This histogram shows a symmetrical line around the 0 value, which indicates normal distribution.

The third assumption is no perfect multicollinearity. Multicollinearity exists if the independent variables are highly correlated. This can be tested using the variance inflator factor (VIF). When the VIF value is greater than ten, that variable shows signs of multicollinearity. After running the VIF test, see Table 3, all but one variable are below the value of ten. Only non-fair value assets shows a value of 14.24, which indicates multicollinearity. However, since this is a control variable and not a variable of interest, this sign of multicollinearity can be ignored (Allison, 2012). The independent variables all have a VIF value of less than two, which indicates no sign of multicollinearity among the independent variables.

Table 3
Variance Inflator Factor

VARIABLE	VIF
FVA1	1.28
FVA2	1.38
FVA3	1.13
FVL12	1.21
FVL3	1.10
NFVA	14.24
NFVL	9.78
NI	1.37
SIZE	4.04
GROWTH	1.11
MAT	1.33

Table 3 shows the variance inflation factors for all variables in the model. A VIF of more than ten indicates strong multicollinearity.

Another way of testing for multicollinearity is the Spearman correlation matrix. Because multicollinearity is only of importance to independent variables, the control variables are excluded from the correlation matrix. Table 4 shows the Spearman correlations of the variables of interest. All but one correlation, FVL3 and PRC, are significant at at least the five percent level. However, there are no extremely large coefficients, which indicates that there is no multicollinearity among the independent variables.

TABLE 4
Spearman Correlations

	PRC	FVA1	FVA2	FVA3	FVL12	FVL3
PRC	1,0000					
FVA1	0,1611	1,0000				
	0,0000					
FVA2	0,2616	0,1658	1,0000			
	0,0000	**0,0000**				
FVA3	0,0913	0,1495	0,1449	1,0000		
	0,0000	**0,0000**	**0,0000**			
FVL12	0,3187	-0,1468	0,0755	0,0508	1,0000	
	0,0000	**0,0000**	**0,0000**	**0,0000**		
FVL3	0,0056	-0,0262	-0,0255	0,1234	0,0114	1,0000
	0,2336	**0,0000**	**0,0000**	**0,0000**	*0,0144*	

Table 4 provides Spearman correlations between the independent variables. The variables are defined in Appendix 3. All bold p-values are significant at the 0,01 level, the italic p-values are significant at the 0,05 level. Significant values indicate that the variable on the left is correlated with the matching variable on the top.

The fourth assumption is linearity. The relation between the dependent and independent variables should be linear. I test for linearity by using augmented partial residual plots for each independent variable. In Appendix 4, these plots are presented. The straight line of data points at the right side of each plot is caused by the winsorizing of outliers. As shown in all five plots, the smoothed line and the ordinary regression line that go through the data plot are close to each other. This indicates that the variables are linear. For all independent variables, the assumption of linearity holds.

The fifth and final assumption is model specification. The model should be properly and completely designed. All included variables need to be relevant, and all relevant variables

should be included. In other words, there should not be any omitted variables. Testing the null hypothesis of no omitted variables using a test based on Ramsy (1969), the results are significant at the one percent level. This indicates that there are variables for this model that are not included. However, since I already included more control variables than most prior literature, and omitted variables are often an issue in statistical models, these results are not a violation of the OLS assumptions.

After using a clustered standard error and winsorizing, the OLS assumptions are met. Therefore, an OLS regression can be used for my model.

4.3 Descriptive Statistics

The descriptive statistics of my sample can be found in Table 5. The final sample consists of 45.885 firm-quarter observations. As shown in Panel A, the total fair value assets are on average 16 percent of the total assets. The relative size of both Level 1 and Level 2 assets is larger than Level 3 assets. The total fair value liabilities are on average five percent of the total liabilities. Level 2 and 3 are relatively larger than Level 1. Because the sample shows a relatively small amount of Level 1 liabilities, I combined Level 1 and 2 liabilities into one variable. Panel B shows the values of the continuous variables per share, because all continuous variables are deflated by common shares outstanding. The total fair value assets are on average 2.29 dollars per share. The total fair value liabilities are on average 0.66 dollars per share. Non-financial companies report more assets than liabilities at fair value. Financial companies show the same distribution between assets and liabilities, but they report overall larger amounts of fair values per share, according to prior literature (Song et al., 2010; Goh et al., 2015).

As shown in Panel C, the number of reported non-zero Level 1 and 2 assets is larger than Level 3 assets. Companies report more often Level 1 and 2 assets, than they report Level 3 assets. Level 2 liabilities is the most common liability Level in quarterly reports, while non-zero Level 1 liabilities are the least common.

TABLE 5
Descriptive Statistics

Panel A: Relative Size of Fair Value Assets and Liabilities

Variable	n (firm-quarters)	mean	Std. Dev.	25th percentile	50th percentile	75th percentile
FVA/total assets	45.885	16,0608%	23,6581%	0,3351%	3,9817%	22,7808%
FVA1/total assets	45.885	9,0957%	17,1758%	0,0000%	0,9489%	10,2168%
FVA2/total assets	45.885	6,4715%	14,9141%	0,0000%	0,1066%	3,2304%
FVA3/total assets	45.885	0,4936%	2,8182%	0,0000%	0,0000%	0,0000%
FVL/total liabilities	45.885	4,6975%	13,4664%	0,0000%	0,1858%	1,7855%
FVL1/total liabilities	45.885	0,8065%	5,9436%	0,0000%	0,0000%	0,0000%
FVL2/total liabilities	45.885	2,3237%	9,4830%	0,0000%	0,0000%	0,5021%
FVL3/total liabilities	45.885	1,5673%	7,3800%	0,0000%	0,0000%	0,0000%

Panel B: Per Share Value of Variables

Variable	n (firm-quarters)	mean	Std. Dev.	25th percentile	50th percentile	75th percentile
PRC	45.885	29,9545	30,4862	8,4300	20,8200	41,2800
FVA1/share	45.885	1,1778	2,2981	0,0000	0,1972	1,2977
FVA2/share	45.885	1,0258	2,7316	0,0000	0,0306	0,6357
FVA3/share	45.885	0,0773	0,3081	0,0000	0,0000	0,0000
FVL1/share	45.885	0,2182	2,1694	0,0000	0,0000	0,0000
FVL2/share	45.885	0,5015	3,4533	0,0000	0,0000	0,0782
FVL12/share	45.885	0,5800	2,2834	0,0000	0,0023	0,1129
FVL3/share	45.885	0,0765	0,3078	0,0000	0,0000	0,0000
NFVA/share	45.885	27,8696	30,5880	5,6802	17,5444	39,3331
NFVL/share	45.885	17,3239	22,6489	2,2539	8,9837	23,1357
NI/share	45.885	0,2715	0,7602	-0,0600	0,1867	0,5653

Table 5 continued

Panel C: Frequency of Non-Zero Reported Fair Value Assets/Liabilities in total sample

Assets	Freq.	%
Level 1	32.221	70%
Level 2	28.654	62%
Level 3	8.893	19%
Liabilities	Freq.	%
Level 1	5.290	12%
Level 2	22.615	49%
Level 3	9.666	21%

Table 5 provides the descriptive statistics of my sample. Panel A shows the relative size of fair value assets and liabilities. Panel B shows the variables deflated by common shares outstanding. Panel C shows the frequency of reported non-zero fair value assets and liabilities in the total sample.

4.4 Results hypotheses 1

4.4.1 Asset Levels

I expect all asset Levels to be value relevant, according to prior literature (Kolev, 2008; Song et al., 2010; Goh et al., 2015). Second, I expect Level 3 to be less value relevant than Level 1.

As shown in Table 6, the t-statistics for all three fair value asset Levels are significant at the one percent level, since all three t-statistics are above 2.59. This indicates that the three asset Levels are all value relevant to investors. Hypothesis 1a for assets can therefore be accepted at the one percent level. This is in line with the expectation that all asset Levels are value relevant to investors.

The negative coefficient for Level 3 assets however is remarkable. This negative coefficient suggests that investors respond negatively to reported Level 3 assets. The share price reduces instead of increases when firms report Level 3 assets, which is opposite to the prediction that asset Levels add firm value. Level 3 assets do generate value relevance to investors, but as if they are liabilities. One possible explanation is based on Simko (1999), and states that there are not enough observations reporting non-zero Level 3 assets. The relative size of Level 3 assets very low compared to Level 1 and 2 assets, only 0.5 percent, as shown in Table 5, Panel A. Besides that, only 19% of the firm-quarter observations report Level 3 assets above zero, see Table 5, Panel B. Relative to the total amount of fair value assets, Level 3 assets are only 3.4 percent. This indicates the lack of economic significance of Level 3 assets.

Another explanation is that investors have no trust in Level 3 asset reporting, and therefore respond negatively to companies who report Level 3 assets, which leads to a decrease of the share price. Assets usually generate firm value, so when investors rather see no assets than Level 3 fair value assets, the faith in management's assessments of Level 3 assets is very low. Investors' trust in subjective fair value asset estimates is much lower for non-financial industries, compared to financial industries in prior literature. This can be caused by the relatively new occurrence of fair value accounting in non-financial industries. In the financial industry, fair value accounting is already largely accepted, while in non-financial industries the use of fair value accounting has only started to grow in previous years (Ramanna, 2013).

TABLE 6
Value Relevance of Fair value Levels for non-financial industries

Dependent variable=Share price (PRC)					
Independent variables	**Coeff.**	**Robust Std. Err.**	**t-stat**	**p-value**	
Intercept	-10.312	0,471	-21.910	0,000	***
FVA1	1.380	0,075	18.440	0,000	***
FVA2	1.789	0,073	24.410	0,000	***
FVA3	-6.162	0,408	-15.110	0,000	***
FVL12	-0,876	0,062	-14.240	0,000	***
FVL3	0,56	0,446	1.250	0,211	
NFVA	0,62	0,019	31.820	0,000	***
NFVL	-0,58	0,023	-25.300	0,000	***
NI	12.064	0,266	45.420	0,000	***
SIZE	2.901	0,082	35.480	0,000	***
GROWTH	0,78	0,038	20.410	0,000	***
MAT	1.562	0,23	6.790	0,000	***
IND:					
15	6.534	0,462	14.130	0,000	***
20	3.592	0,384	9.360	0,000	***
25	8.216	0,415	19.810	0,000	***
30	10.050	0,562	17.870	0,000	***
35	12.321	0,422	29.170	0,000	***
45	7.053	0,378	18.640	0,000	***
50	-2.123	0,633	-3.360	0,001	***
55	-8.483	0,501	-16.940	0,000	***
n	45.885				
Adj. R^2	0,54%				

Coefficient comparisons	**F-stat**	**p-value**	
FVA1=FVA3	358,200	0,000	***
FVL12=FVL3	9,950	0,002	***

Table 6 provides the output for the OLS regression of Model (1): PRC = α_0 + α_1FVA1 + α_2FVA2 + α_3FVA3 + α_4FVL12 + α_5FVL3 + B_1NFVA + β_2NFVL + β_3NI + β_4MAT + β_5SIZE + β_6GROWTH +β_7IND + Ɛ. *,**,*** show the statistical significance at the 10%, 5%, and 1% level, respectively. Significant t-statistics indicate the substantial influence of that variable on the dependent variable share price. The results surrounded by a red square are results that are not according to the prediction based on prior literature, and will be discussed in the main text.

The difference between Level 1 and 3 assets is significant at the one percent level. This indicates that all asset Levels are value relevant to investors, but Level 1 is more value relevant than Level 3. Investors' response is larger for reported Level 1 assets, than for reported Level 3 assets. Hypothesis 1b for assets can therefore be accepted at the one

percent level, which is in line with the prediction. However, the F-statistic is much larger in this research than in prior literature. Song et al. (2010) and Goh et al. (2015) report an F-statistic of 17.25 and 74.98 respectively. The F-statistic of this research is 358.20. This is caused by negative value relevance of Level 3 assets in this research, compared to the positive value relevance of Level 3 assets in prior literature (Song et al., 2010; Goh et al., 2013).

4.4.2 Liability Levels

The expectation for liabilities is identical to the expectation for assets. All three liability Levels are value relevant to investors, but Level 3 is less relevant than Level 1.

As shown in Table 6, the coefficient for Level 1 & 2 liabilities is negative and the t-statistic is significant at the one percent level. The t-statistic for Level 3 liabilities is not significant, because it is below 1.65. These results indicate that only Level 1 & 2 liabilities are value relevant to investors and Level 3 is not. This suggests that investors do not respond to reported Level 3 liabilities, only to reported Level 1 & 2 liabilities. Hypothesis 1a needs to be rejected for liabilities, because Level 3 liabilities are not value relevant to investors.

The insignificance of Level 3 liabilities can be explained by the low frequency of Level 3 liability reporting in this sample, which reduces the economic significance according to Simko (1999). The value of Level 3 liabilities is only 0.08 dollars per share, while Level 1 & 2 is 0.58 dollars per share, see Table 5, Panel B. Only 20% of the firm-quarter observations report non-zero Level 3 liabilities, see Table 5, Panel C. Compared to the total amount of fair value liabilities, the amount of Level 3 liabilities is only 11.7 percent. Due to this low frequency of non-zero Level 3 reporting, it is possible that investors do not find Level 3 liabilities of much interest, and therefore do not respond to reported Level 3 liabilities, which leads to no value relevance.

Level 3 liabilities are not value relevant to investors, according to the results for Hypothesis 1a. Since the value relevance of Level 1 & 2 is significant, this value relevance is logically larger than the non-existing value relevance of Level 3 liabilities. Hypothesis 1b can therefore be accepted for liabilities.

4.4.3 Control variables and Adjusted R^2

The control variables in this model are all significant, which indicates their importance in the regression. All industry dummy variables are significant at the one percent level. This indicates that the value relevance depends on the industry.

The new control variable materiality is also significant at the one percent level, with a positive coefficient. This indicates that the response from investors to fair value Levels, and thus the change of the share price, is larger for companies who report a relatively large amount of fair value estimates compared to companies who report a lower amount of fair value estimates.

The Adjusted R^2 is 54 percent. This percentage is in line with previous literature. Kolev (2008) reports an adjusted R^2 of 58 percent, Song et al. (2010) report an adjusted R^2 of 50 percent, and Goh et al. (2015) report 74 percent.

4.4.4 Sub-question one

With the results for hypotheses one, I can now answer the first sub question:

Is the value relevance of fair value accounting dependent on the industry?

Since all industry dummies are significant, the relevance of fair value Levels is dependent on industry. Industries have a different frequency of reported fair value Levels, and some industries report higher amounts of fair values than other industries. The differences in statistics between industries for the three largest non-financial industries is shown in Table 8. In total, the value relevance of the non-financial sectors are significant, with the exception of Level 3 liabilities. The differences in value relevance between fair value Levels is also significant for the non-financial industries as a total.

In order to see some of the statistical differences, I re-run regression (1) separately for the three largest non-financial industries; IT, Consumer Products, and Health Care. The results are shown in Table 7. These results shows some minor differences between these three sectors.

The value relevance of Level 1 and 2 assets and Level 1 & 2 liabilities are significant at the one percent level for all three sectors, which is in line with the results for the total sample and prior literature. However, the value relevance of Level 3 assets is only significant in the Consumer Products and Health Care sectors. This indicates that Level 3 assets are not value

relevant for the IT sector. However, the difference between the statistics of Level 3 assets for these industries are minimal, as shown in Table 8. Level 3 assets are all around the six percent of total assets, and the value per share is around seven cents per share, see Table 8. When there is no difference in fair value accounting of Level 3 assets, the difference in value relevance can lie in the type of investor that differs per industry. This however lies beyond the scope of this research.

Table 7
Value Relevance of Fair Value Levels for the three largest non-financial industries

Dependent variable=Share price (PRC)

	Consumer Products 25+30			Health Care 35			IT 45		
Independent variables	**Coeff.**	**t-stat**	**p-value**	**Coeff.**	**t-stat**	**p-value**	**Coeff.**	**t-stat**	**p-value**
Intercept	-3,199	-3,71	0,000 ***	-0,542	-0,870	0,385	-4,261	-6,780	0,000 ***
FVA1	1,700	7,670	0,000 ***	1,569	8,700	0,000 ***	1,821	14,460	0,000 ***
FVA2	1,963	8,750	0,000 ***	2,303	14,590	0,000 ***	2,516	21,520	0,000 ***
FVA3	-8,448	-10,630	0,000 ***	-7,479	-6,230	0,000 ***	-0,061	-0,740	0,460
FVL12	-0,477	-3,770	0,000 ***	-1,495	-7,380	0,000 ***	-0,055	-3,440	0,001 ***
FVL3	-2,813	-2,940	0,003 ***	5,502	5,680	0,000 ***	11,736	5,950	0,000 ***
NFVA	0,429	10,910	0,000 ***	1,179	19,430	0,000 ***	0,056	13,400	0,000 ***
NFVL	-0,269	-6,190	0,000 ***	-1,299	-19,910	0,000 ***	-0,451	-7,870	0,000 ***
NI	15,802	28,670	0,000 ***	9,029	9,970	0,000 ***	10,157	13,800	0,000 ***
SIZE	2,607	14,060	0,000 ***	2,814	12,400	0,000 ***	2,396	13,580	0,000 ***
GROWTH	1,037	10,480	0,000 ***	0,678	8,970	0,000 ***	0,954	11,990	0,000 ***
MAT	1,303	2,340	0,019 **	2,574	4,600	0,000 ***	1,192	2,930	0,003 ***
n	9.350			8.218			10.984		
Adj. R^2	0,50			0,60			0,55		

Coefficient comparison	**F-stat**	**p-value**	**F-stat**	**p-value**	**F-stat**	**p-value**
FVA1=FVA3	146,740	0,000 ***	54,320	0,000 ***	8,370	0,004 ***
FVL12=FVL3	5,520	0,019 **	51,040	0,000 ***	38,780	0,000 ***

Table 7 shows the OLS regression output for Model (1) for the three largest non-financial industries separately. These industries are selected based on number of observations. *,**,*** show the statistical significance at the 10%, 5%, and 1% level, respectively. Significant t-statistics indicate the substantial influence of that variable on the dependent variable share price. The results surrounded by a red square are remarkable results which differ from the results of the total sample or prior literature and are discussed in the main text.

TABLE 8
Descriptive Statistics per industry

Sector	**Consumer Products (25+30)**	**Health Care Sector (35)**	**IT Sector (45)**
n	**9.350**	**8.218**	**10.984**
Panel A: Relative Size of Fair Value Assets and Liabilities			
Variable	Mean	Mean	Mean
FVA/total assets	7,8362%	36,6823%	24,3222%
FVA1/total assets	4,6270%	20,2105%	13,3761%
FVA2/total assets	2,6051%	15,8589%	10,3705%
FVA3/total assets	0,6041%	0,6129%	0,5756%
FVL/total liabilities	4,7760%	7,1054%	2,3260%
FVL1/total liabilities	1,2395%	0,4615%	0,2699%
FVL2/total liabilities	2,5057%	1,9444%	1,2924%
FVL3/total liabilities	1,0308%	4,6995%	0,7638%
Panel B: Per Share Value of Variables			
Variable	Mean	Mean	Mean
PRC	33,5184	27,3785	24,6667
FVA1/share	0,9295	1,2879	1,5211
FVA2/share	0,6978	1,6373	1,4786
FVA3/share	0,0927	0,0641	0,0695
FVL1/share	0,2812	0,0579	0,0306
FVL2/share	0,5856	0,2165	0,1352
FVL12/share	0,7625	0,2595	0,1628
FVL3/share	0,0740	0,1253	0,0259
NFVA/share	30,3315	15,1607	14,3929
NFVL/share	19,6107	9,4402	8,2055
NI/share	0,3613	0,1104	0,1699
Panel C: Frequency of Non-Zero Reported Fair Value Assets/Liabilities per industry			
Non-Zero Assets			
Level 1	5.803	6.540	9.205
	45%	51%	49%
Level 2	5.424	4.977	7.317
	42%	39%	39%
Level 3	1.756	1.299	2.344
	14%	10%	12%
Non-Zero Liabilities			
Level 1	1.137	404	620
	15%	8%	10%
Level 2	4.996	2.286	4.029
	65%	43%	62%
Level 3	1.530	2.640	1.821
	20%	50%	28%

Table 8 shows the descriptive statistics for the three largest industries. Panel A shows the relative size of the fair value items, Panel B shows the value per share, and Panel C shows the frequency of non-zero reported fair value items.

For the other two sectors, investors' response to Level 3 assets is negative, which indicates their loss of trust in subjective estimates in these sectors. This is in line with the results of the total sample, but not with prior literature.

Level 3 liabilities are significant at the one percent level for all sectors, however the coefficient has an opposite sign for Health Care and IT. This suggests that investors respond positively to Level 3 liabilities, which is surprising given that liabilities decrease firm value. However, these results can be biased due to the low frequency of Level 3 liabilities in the samples, see Table 8. For the consumer products sector, the coefficient is significant and negative, with is in line with prior research but not with the results for the total sample.

Control variables behave equally in all sectors and are comparable with the results for the total sample. Materiality in the Consumer Products sector differs slightly, because the coefficient is only significant at the five percent level, instead of the one percent level in the total sample results.

The final difference is the difference in value relevance between Level 1 & 2, and 3 liabilities. This difference is only significant at the five percent level for the Consumer Products sector, and at the one percent level for the other two sectors. In the total sample results, this significance is one percent.

These results show that the value relevance of fair value accounting in the total non-financial sector is significant for all but one fair value Level, and that there are minor differences in value relevance between sectors. The answer to sub-question one therefore is yes.

4.5 Results hypotheses 2

4.5.1 Asset Levels

For hypotheses 2, I examine the difference in value relevance over time. According to the prediction, the value relevance of Level 1 remains unchanged over time, while the value relevance of Level 3 increases after the crisis. Besides that, the difference between Level 1 and Level 3 value relevance decreases after 2010, the year ASU No. 2010-06 was implemented. As shown in Table 9, Level 1 assets are significant during and after the crisis, at the one percent level, indicating that Level 1 assets are value relevant to investors during and after the crisis.

Table 9
Value Relevance of Fair Value Levels for non-financial industries per year

Dependent variable=Share price (PRC)

	Crisis				Post-Crisis			
Independent variables	**Coeff.**	**t-stat**	**p-value**		**Coeff.**	**t-stat**	**p-value**	
Intercept	-6,873	-3,890	0,000	***	-9,942	-20,590	0,000	***
FVA1	0,768	2,950	0,003	***	1,384	18,070	0,000	***
FVA2	1,278	4,700	0,000	***	1,819	24,050	0,000	***
FVA3	0,643	0,670	0,503		-6,770	-15,160	0,000	***
FVL12	-0,090	-0,280	0,780		-0,898	-14,380	0,000	***
FVL3	-0,269	-0,200	0,842		0,556	1,200	0,230	
NFVA	0,522	7,660	0,000	***	0,613	30,620	0,000	***
NFVL	-0,629	-8,430	0,000	***	-0,561	-23,840	0,000	***
NI	6,329	11,640	0,000	***	12,699	43,680	0,000	***
SIZE	2,411	7,780	0,000	***	2,921	34,790	0,000	***
GROWTH	1,054	7,900	0,000	***	0,735	18,610	0,000	***
MAT	1,329	1,430	0,154		1,312	5,550	0,000	***
n	3.035				42.850			
R2	0,47				0,54			
Coefficient comparison	**F-stat**		**p-value**		**F-stat**		**p-value**	
FVA1=FVA3	0,020		0,906		319,300		0,000	***
FVL12=FVL3	0,020		0,903		9,490		0,002	***

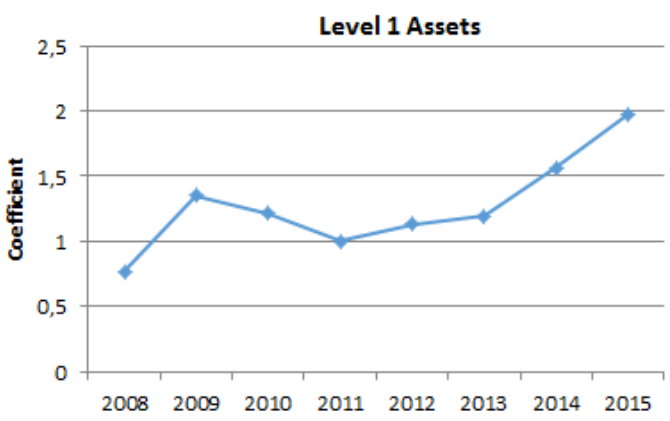
Table 9 shows the OLS regression output for Model (1) for the crisis period (2008) and the post-crisis period (2009-2015). *,**,*** show the statistical significance at the 10%, 5%, and 1% level, respectively. Significant t-statistics indicate the substantial influence of that variable on the dependent variable share price. In other words, this significance indicates value relevance.

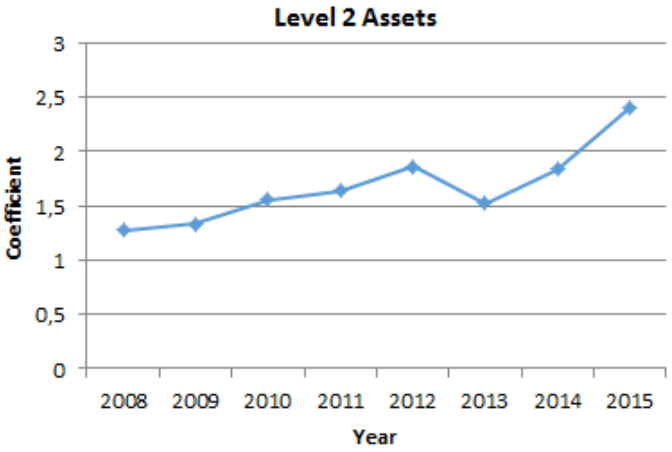
The coefficient of Level 1 assets increases from 0.77 during the crisis to 1.38 after the crisis. The t-statistic increases from 2.95 to 18.07. This indicates the growing value relevance of Level 1 assets after the crisis. The same holds for Level 2 assets, which are also significantly value relevant in both time periods, and their relevance grows after the crisis. This effect is also shown in Graph 2, Part 1, where the coefficients are plotted per year. The value relevance of Level 1 assets increases sharply short after the crisis, and Level 2 increases more steadily. Overall, the trend is increasing for both Level 1 and 2 assets, which indicates the increasing value relevance of Level 1 assets after the crisis.

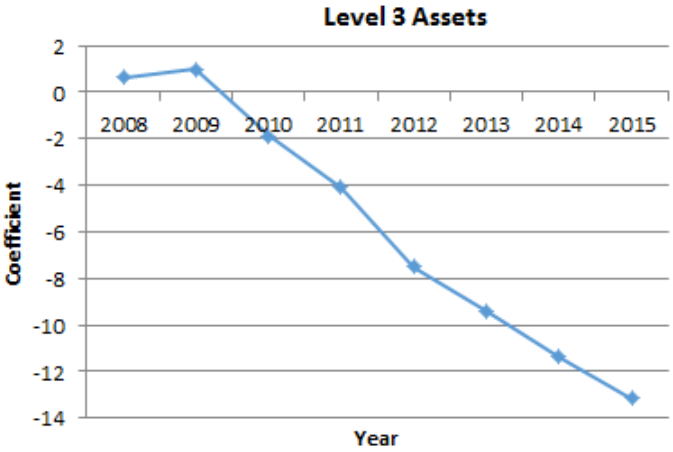
Graph 2

Value Relevance per Level asset/liability over time

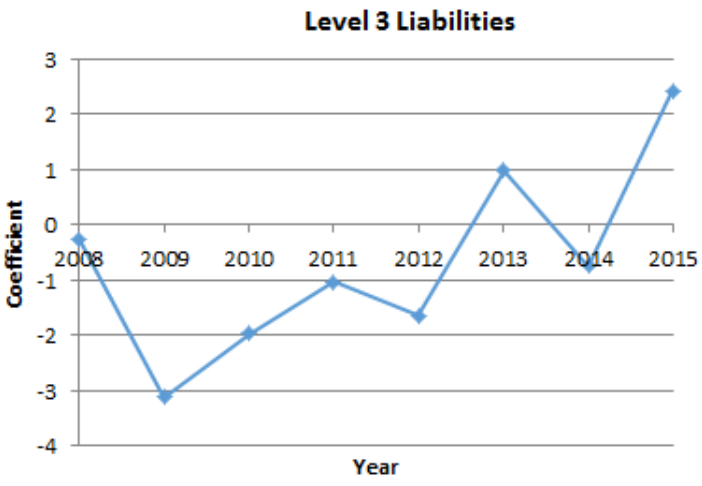
Part 1: Assets







Part 2: Liabilities



Graph 2 shows the movement of the variable coefficients over time, per independent variable. Coefficients further from the X-axis are more significant, indicating more value relevance of this variable in that year.

Level 3 assets are not value relevant to investors during the crisis, but become significantly relevant after the crisis, see Table 9. The absolute t-statistic increases from 0.67 to 15.16, which indicates the growing value relevance after the crisis. However, the coefficient of Level 3 assets becomes negative after the crisis, which is also the case in the total sample regression output in Table 6. This negative coefficient is probably caused by the low frequency and total amount of Level 3 assets in the post-crisis sample. This sample contains 42.850 total observations. Only 7.986 observations report non-zero Level 3 assets. The total (deflated) amount of Level 3 assets in this sample is $2.999, which is only three percent of the total fair value assets in this sample. The results are therefore not very reliable. Another explanation would be the loss of trust in Level 3 assets after the crisis. Investors could perceive Level 3 fair value as unreliable due to the crisis, which makes their response to this fair value Level negative. This effect is also shown in Graph 2, Part 1. The value relevance of Level 3 assets increases sharply after 2009, however the sign is opposite to what I would have expected according to prior literature (Goh et al., 2015). However, the value relevance is lower during the crisis than after the crisis.

Hypothesis 2a needs to be rejected, since the value relevance of Level 1 does not remain unchanged, but increases after the crisis. Level 3 does become more value relevant post-crisis, which is according to the prediction. However, this effect is negative and unreliable.

These results suggest that investors discount all asset Levels during the crisis, because these Levels are no longer reliable. Due to inactive markets and decreasing asset prices, the market-based fair values, Level 1, decreased rapidly, which is, according to opponents, one of the causes of the financial crisis (ABA, 2008; Wallison, 2008; Whalen, 2008). However, even during the crisis the value relevance of Level 1 assets is significant. The results therefore suggest that market-based fair values are less useful during a crisis than after, but they remain value relevant to investors. Model-based fair values, Level 3, are not value relevant during the crisis, and become negatively relevant after the crisis. This indicates the overall lack of trust in Level 3 assets.

Second, I look at the difference in value relevance between Level 1 and 3 assets, to see whether the difference in value relevance decreases over time. First of all, Table 9 shows that the difference between the value relevance of Level 1 and 3 asset Levels increases post-crisis. In-crisis this difference was not significant with an F-statistic of 0.02, while post-crisis this F-statistic increases to 319.30. Graph 3 shows that the difference between Level 1 and Level 3 assets increases over time. Only the difference between Level 1 and 2 remains steady.

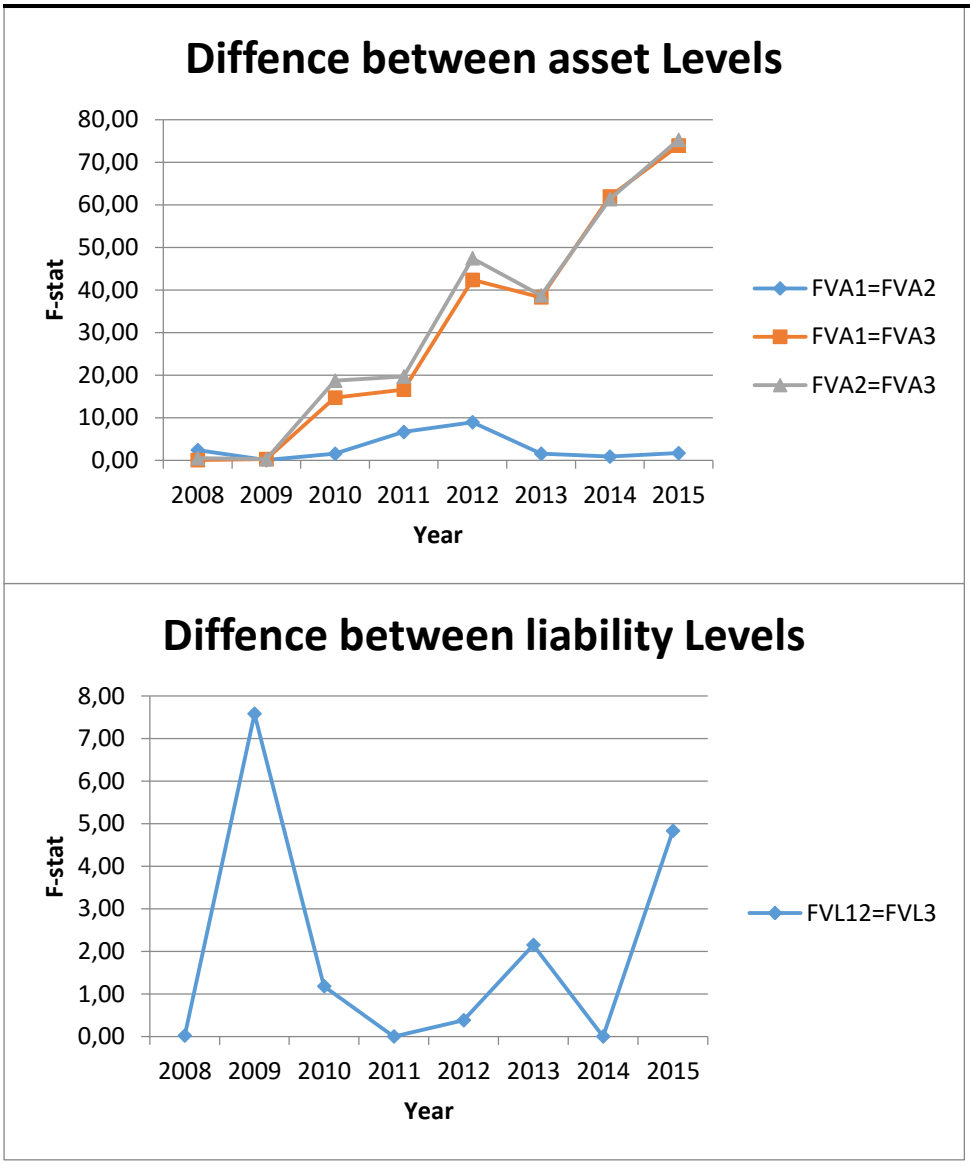
In 2010, when ASU No. 2010-06 was implemented, the increasing difference in value relevance between Level 1 and Level 3 assets slows down. This indicates that the amendment had an effect on the value relevance difference between Level 1 and 3 assets, because the increasing difference slowed down shortly after the implementation of this amendment. However, this is only a short-term effect, because after 2011 the difference starts to increase rapidly again. Hypothesis 2b needs to be rejected, because even though the increasing difference slowed down shortly after the implementation, it still does not decrease.

4.5.2 Liability Levels

As shown in table 9, the value relevance of all liability Levels is not significant during the crisis. After the crisis, only Level 1 & 2 become significant. The absolute t-statistic of Level 1 & 2 liabilities increases from 0.28 during the crisis to 14.38 after the crisis. The absolute t-statistic of Level 3 liabilities increases from 0.20 to 1.20. This indicates that the value relevance of both Levels increases, but only the value relevance of Level 1 & 2 increases significantly.

The coefficient of Level 1 & 2 decreases after the crisis, as shown in Graph 2, Part 2. This indicates increasing value relevance post-crisis. The increase in value relevance is the largest shortly after the crisis. Level 3 is not value relevant to investors in- and post-crisis. Shortly after the crisis, the coefficient decreases to a significant level, see Graph 2, Part 2. Level 3 liabilities therefore do become significantly value relevant shortly after the crisis, but this effect only holds for two years, at the one and five percent level, respectively. With these results, Hypothesis 2a needs to be rejected for liabilities, because the value relevance of Level 1 & 2 liabilities does not remain unchanged, but increases, and the value relevance for Level 3 only increases shortly after the crisis, but this effect disappears in the longer run.

Graph 3
The difference in value relevance between Levels over time



Graph 3 shows the change in the value relevance difference over time. A F-statistic close to 0 indicates no significant difference between the value relevance of the two Levels, while large F-statistics indicate a large/significant difference between Levels.

Second, I look at the difference in value relevance between liability Levels over time. In-crisis, this difference between Level 1 & 2, and 3 liabilities is not significant with an F-statistic of 0.02, but becomes significant post-crisis with an F-statistic of 9.49. This indicates that the value relevance of Level 1 & 2, and 3 is the same during the crisis, and differs statistically after the crisis. As shown in Graph 3, the difference in value relevance increases sharply shortly after the crisis, and becomes significant at the one percent level. The effect of ASU No. 2010-06 is indeed visible, since the difference between Level 1 & 2, and 3 decreases rapidly in 2010 and 2011. This effect is only short term, because the difference in value

relevance increases again after 2011. Hypothesis 2b can therefore only be accepted at the short-term level.

4.5.3 Sub-question two

With the results for hypotheses two, I can now answer the second sub question:

Did the 2008 financial crisis have an impact on the value relevance of fair value accounting?

The crisis did have an impact on the value relevance, but opposite as from what I predicted. Hypothesis 2a needed to be rejected for both assets and liabilities, because the value relevance of Level 1 increased after the crisis. However, I predicted that Level 1 remained unchanged during and after the crisis. Investors therefore do discount Level 1 during the crisis, because Level 1 becomes less reliable due to inactive markets and decreasing market prices. This is in line with the reasoning of fair value accounting opponents, who argue that Level 1 fair value estimates contributed to the financial crisis (Bout, ter Hoeven and Langendijk, 2010; Laux et al., 2009; Pozen, 2009). Level 3 assets and liabilities also increase after the crisis, but this effect is only visible in the short run. Overall, investors discount all types of fair value Levels during the financial crisis, and their value relevance increases post-crisis, even though for Level 3 this increase of relevance is only for one year.

The ASU No. 2010-06 on more Level 3 disclosure would lower information asymmetry and therefore increase the trust and confidence of investors in Level 3 fair value. This would decrease the difference in value relevance between Level 1 and Level 3. This effect is shown, especially for liabilities, but only for the short term.

The financial crisis and the here out following ASU No. 2010-06 did indeed have an impact on the value relevance, however this impact is mostly short-term and different from the expectation. Sub question two van however be positively answered.

4.6 Sensitivity analysis

In order to check the robustness of my results, I conducted a sensitivity analysis. The first analysis changes the deflation method. In the original model, I deflated all variables to common shares outstanding. Another way of deflating variables is to use the lagged total assets. The coefficients and t-statistics of the independent variables do not change substantially when I deflate all continuous variables to lagged total assets. The results to this

first analysis is found in Table 10, Panel A. I only included the dependent and independent variables in this table, because these are the variables of interest.

Table 10
Sensitivity Analysis

Panel A: Deflated by lagged total assets					
Dependent variable=Share price (PRC)					
Independent variables	**Coeff.**	**Robust Std. Err.**	**t-stat**	**p-value**	
Intercept	-5,192	0,870	-5,970	0,000	***
FVA1	4,937	1,910	2,580	0,010	**
FVA2	15,852	1,163	13,630	0,000	***
FVA3	-29,932	2,599	-11,520	0,000	***
FVL12	-5,538	1,759	-3,150	0,002	***
FVL3	3,628	2,893	1,250	0,210	

Panel B: Excluding some control variables					
Dependent variable=Share price (PRC)					
Independent variables	**Coeff.**	**Robust Std. Err.**	**t-stat**	**p-value**	
Intercept	11,147	0,150	74,410	0,000	***
FVA1	1,749	0,074	23,540	0,000	***
FVA2	2,258	0,073	31,020	0,000	***
FVA3	-6,514	0,446	-14,610	0,000	***
FVL12	-0,961	0,066	-14,510	0,000	***
FVL3	0,694	0,481	1,440	0,149	
NFVA	0,840	0,017	48,63	0,000	***
NFVL	-0,675	0,023	-28,88	0,000	***
NI	13,147	0,262	52,11	0,000	***

Panel C: Level 1 and 2 liabilities separately					
Dependent variable=Share price (PRC)					
Independent variables	**Coeff.**	**Robust Std. Err.**	**t-stat**	**p-value**	
Intercept	-10,404	0,473	-22,000	0,000	***
FVA1	1,359	0,075	18,130	0,000	***
FVA2	1,739	0,074	23,510	0,000	***
FVA3	-6,437	0,409	-15,730	0,000	***
FVL1	-0,331	0,081	-4,080	0,000	***
FVL2	-0,181	0,102	-1,770	0,077	*
FVL3	0,398	0,450	0,880	0,376	

Table 10 shows the three robustness checks conducted. In Panel A, the method of deflation is changed from common shares to lagged total assets. In Panel B, the control variables which are not used in Song et al., 2010 and Goh et al., 2015 are excluded. In Panel C, the variable FVL12 is split in Level 1 and Level 2 liabilities separately.

Song et al. (2010) and Goh et al. (2015) use only the control variables non-fair value assets and liabilities, and net income. For the second part of my sensitivity analysis, I re-run the regression, excluding all other control variables except the ones used by Song et al. (2010) and Goh et al. (2015). The results of this analysis can be found in Table 10, Panel B. The signs and significance of the coefficients and t-statistics are again comparable to the original model, indicating the robustness of this model.

For the final robustness check, the variable FVL12 is split into FVL1 and FVL2. These results can be found in Table 10, Panel C. Again, the results are comparable to the original results.

The sensitivity analysis did not show substantial or surprising deviations from the original model. With this analysis, I have checked the robustness of my original results.

4.7 Summary and conclusion

After winsorizing and using a robust and clustered standard error, an OLS regression can be used for this research. Hypotheses 1a and 1b are both accepted at the one percent level for assets. All three asset Levels are value relevant to investors, but Level 1 is more value relevant than Level 3. However, for liabilities, Hypothesis 1a needs to be rejected, because Level 3 liabilities are not value relevant to investors. This can be caused by the low economic significance of Level 3 liabilities, as is the case in Simko (1999). Hypothesis 1b for liabilities can be accepted, because logically Level 1 liabilities are more value relevant than Level 3 liabilities.

The non-financial sector shows significant value relevance for all fair value Levels, except Level 3 liabilities. The difference between levels is also significant, indicating larger value relevance for Level 1 than for Level 3 fair value estimates. Fair value accounting therefore adds firm value for the non-financial sectors, which is in line with the preference of the FASB and IASB to use fair value accounting. Differences between individual sectors do exist, but are minor. The first sub-question can be answered positively; value relevance is indeed dependent on the industry.

Hypothesis 2a is rejected for both assets and liabilities. The value relevance of Level 1 increases after the crisis. Level 3 also increases after the crisis, which is predicted by Hypothesis 2a, but this effect only holds for the short term. Hypothesis 2b is rejected for assets, but is accepted for liabilities for the short term. The increasing difference between

Level 1 and 3 assets only slows down shortly after the implementation of ASU No. 2010-06, but does not start to decrease. However, the difference between liabilities decreases shortly after the implementation, but only holds for one year. The second sub-question can be answered positively. However, the predicted effect of the crisis on Level 1 is actually the opposite, and the effects only hold for the short term. The sensitivity analysis indicates the robustness of my original results.

Chapter 5 Conclusion

5.1 Introduction

This section concludes my thesis. In subsection 6.2, a summary of the results and their analysis is presented, together with an answer to the research question. In subsection 6.3, the limitations to my research and avenues for further research are presented.

5.2 Conclusion

I conducted research to the value relevance of fair value accounting under SFAS 157 for non-financial industries, and the effects of the financial crisis to this value relevance. The results show some interesting findings compared to prior literature. Fair value asset Levels are all value relevant to investors, but the value relevance of Level 3 assets behaves as liabilities. In other words, investors perceive Level 3 asset reporting as firm value decreasing instead of increasing. Fair value liability Levels are only value relevant for Level 1 and 2. Investors do not perceive Level 3 liabilities of interest.

In line with prior literature, the value relevance of Level 1 fair value is larger than the value relevance of Level 3 fair value. The difference between industries exists, but is minor. The value relevance of fair value Levels is partly dependent on industry.

When comparing the value relevance of fair value Levels over time, the results are interesting. The value relevance of Level 1 fair value estimates increases after the crisis, which indicates that investors do discount market-based fair value accounting during the crisis. The value relevance of Level 3 fair value also increases after the crisis, but this only a short term effect.

The difference between Level 1 and 3 assets increases after the crisis, but slows down when the amendment ASU N0. 2010-06 was implemented. However, the difference does not decrease. The liability difference also increases after the crisis, and decreases shortly after the implementation of this amendment.

The crisis and the there-out following amendment to SFAS 157 does have an impact on the value relevance of fair value accounting.

The main research question on whether all levels of fair value estimates are value relevant for non-financial industries needs to be negatively answered. Level 3 liabilities are not value

relevant to investors. However, all other fair value Levels are value relevant. These results suggest an overall value relevance of fair value accounting under SFAS 157 for the non-financial industry, which indicates the importance of fair value accounting in these industries. This is opposite from prior literature that suggests the economic insignificance of fair value accounting for the non-financial sectors (Simko, 1999; Kuiper and ter Hoeven, 2013).

5.3 Limitations and further research

This research has some limitations. First, the internal validity is not optimal, there are signs of omitted variables. However, I already included more control variables than most prior literature, and the existence of omitted variables is always a problem with this kind of research. Second, the external validity is limited to U.S. companies. However, the fair value regulation in the U.S. is more advanced than in other parts of the world, because SFAS 157 was already implemented in 2007. I also extended my research to more industries than previous research, which is only focused on the financial industry. Third, I assume the effective market theory to hold. This is an assumption necessary to this research, but it limits the validity of this research because the effective market theory does not hold in real markets. The final limitation to this research is the low frequency of Level 3 fair value reporting compared to the frequency in research conducted for the financial sector. Due to this difference, the results differ from the financial industry. This is an indication that the financial industry is indeed more advanced with regards to fair value accounting than the non-financial industry, especially regarding the use of Level 3 fair value accounting.

Further research can examine the reasons for the non-existing value relevance of Level 3 liabilities, and the opposite value relevance of Level 3 assets more in depth. By means of surveys, the actual response from investors can be examined. Another avenue for further research is a closer examination of the short term effects of the crisis. These two subjects are linked to my research, however they are not the main focus.

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Appendix 1: Fair value disclosure example AETNA Inc.

This appendix shows a part of the disclosure belonging to the 10-Q report of AETNA Inc. for the period ended March 31, 2015. AETNA Inc. is a health care company for health plans and dental coverage. This part of the disclosure is mandatory under SFAS 157 and describes how the Level hierarchy under SFAF 157 works, and how the balance sheet items valued at fair value are constructed. This filing can be found on: *file:///C:/Users/nltette3/Downloads/Q1-15%20Form%2010-Q%20(Final%20with%20exhibits)%20(1).pdf. Total amounts of fair value are disclosed per balance sheet item per Level, including their totals. This disclosure is a requirement under SFAS 157.*

Financial Instruments Measured at Fair Value in our Balance Sheets

Certain of our financial instruments are measured at fair value in our balance sheets. The fair values of these instruments are based on valuations that include inputs that can be classified within one of three levels of a hierarchy established by GAAP. The following are the levels of the hierarchy and a brief description of the type of valuation information ("inputs") that qualifies a financial asset or liability for each level:

Level 1 – Unadjusted quoted prices for identical assets or liabilities in active markets.

Level 2 – Inputs other than Level 1 that are based on observable market data. These include: quoted prices for similar assets in active markets, quoted prices for identical assets in inactive markets, inputs that are observable that are not prices (such as interest rates and credit risks) and inputs that are derived from or corroborated by observable markets.

Level 3 – Developed from unobservable data, reflecting our own assumptions.

Financial assets and liabilities are classified based upon the lowest level of input that is significant to the valuation. When quoted prices in active markets for identical assets and liabilities are available, we use these quoted market prices to determine the fair value of financial assets and liabilities and classify these assets and liabilities in Level 1. In other cases where a quoted market price for identical assets and liabilities in an active market is either not available or not observable, we estimate fair value using valuation methodologies based on available and observable market information or by using a matrix pricing model. These financial assets and liabilities would then be classified in Level 2. If quoted market prices are not available, we determine fair value using broker quotes or an internal analysis of each investment's financial performance and cash flow projections. Thus, financial assets and liabilities may be classified in Level 3 even though there may be some significant inputs that may be observable.
Financial assets and liabilities measured at fair value on a recurring basis in our balance sheets at March 31, 2015 were as follows:

10-Q Filing March 31, 2015 of Aetna Inc.

Financial assets and liabilities measured at fair value on a recurring basis in our balance sheets at March 31, 201 were as follows:

(Millions)	**Level 1**	**Level2**	**Level3**	**Total**
March 31, 2015				
Assets:				
Debt securities:				
U.S. government	$ 1,253.9	$ 197.2	$ -	$ 1,451.1
States, municipalities and political subdivisions	-	4,859.4	1.1	4,860.5
U.S. corporate	-	8,561.4	56.1	8,617.5
Foreign	-	3,515.1	31.8	3,546.9
Residential mortgage-backed	-	915.3	-	915.3
Commercial mortgage-backed	-	1,344.0	7.5	1,351.5
Other asset-backed	-	708.5	41.8	750.3
Redeemable preferred	-	64.0	4.1	68.1
Total debt securities	1,253.9	20,164.9	142.4	21,561.2
Equity securities	1.8	-	20.8	22.6
Derivatives	-	.3	-	.3
Total	$ 1,255.7	$ 20,165.2	$ 163.2	$ 21,584.1
Liabilities:				
Derivatives	$ -	$ 69.5	$ -	$ 69.5

There were no transfers between Levels 1 and 2 during the three months ended March 31, 2015 or 2014. During the three months ended march 31, 2015 and 2014, we had an immaterial amount of gross transfers into and out of Level 3 financial assets.

Appendix 2: Summary prior research

Author	Year	Title	Subject(s) of value relevance research	Time period	Summary results
Barth, M. E.	1994	Fair value accounting: Evidence from investment securities and the market valuation of banks.	banks' investment securities (+ gains and losses)	Annual, 1990	i: significant incremental explanatory power for investment securities' fair value; ii: no significant incremental explanatory power for historical costs.
Barth, M. E., Beaver, W. H., & Landsman, W. R.	1996	Value-relevance of banks' fair value disclosures under SFAS No. 107 (Digest Summary)	banks' loans, securities, deposits, long-term debt, and off-balance sheet items	Annual, 1992-1993	i: significant incremental explanatory power for fair values of loans, securities, and long-term debt; ii: no significant incremental explanatory power for fair values of deposits and off-balance sheet items.
Eccher, E. A., Ramesh, K., & Thiagarajan, S. R.	1996	Fair value disclosures by bank holding companies	Banks' loans, securities, deposits, long-term debt, and off-balance sheet items	Annual, 1992-1993	i: significant incremental explanatory power for fair values of loans, securities, long-term debt, and (market-related) off-balance sheet items; ii: no incremental explanatory power for deposits' fair value; iii: explanatory power loans' fair value weaker than securities' fair value.
Nelson, K. K.	1996	Fair value accounting for commercial banks: an empirical analysis of SFAS No. 107	Banks' loans, securities, deposits, long-term debt, and off-balance sheet items	Annual, 1992-1993	i: significant incremental explanatory power for securities' fair value, however company growth eliminates this significance; ii: no significant incremental explanatory power for fair value of loans, deposits, long-term debt, and off-balance sheet items.
Simko, P. J.	1999	Financial instrument fair values and nonfinancial firms	Corporates' financial instrument assets and liabilities, and derivative instruments	Annual, 1992-1995	i: significant incremental explanatory power for fair value liabilities, however significance holds only for companies is a loss position and for substantial differences between fair value and book value; ii: no significant incremental explanatory power for financial instrument assets and derivatives, probably due to economic insignificance.

Summary prior research continued

Khurana, I. K., & Kim, M. S.	2003	Relative value relevance of historical cost vs. Fair value: Evidence from bank holding companies	Banks' loans, securities, deposits, and financial liabilities other than deposits.	Annual, 1995-1998	i: significant relative explanatory power for fair value over historical cost for available-for-sale securities; ii: significant relative explanatory power for historical cost over fair value of loans and deposits; iii: no difference explanatory power fair value and historical cost for held-to-maturity securities and financial liabilities other than deposits; iv: no overall difference in explanatory power between fair value and historical cost, however historical cost is more informative than fair value for small banks and banks with no analyst following.
Kolev, K. S.	2008	Do investors perceive marking-to-model as marking-to-myth? Early evidence form FAS 157 disclosure.	Banks' Level 1, 2, and 3 fair value assets and liabilities	Quarterly, Q1-Q2 2008	i: significant value relevance of Level 1, 2, and 3 net assets, however Level 3 net assets are significantly lower than Level 1 net assets
Song, C. J., Thomas, W. B., & Yi, H.	2010	Value relevance of FAS No. 157 fair value hierarchy information and the impact of corporate governance mechanisms.	Banks' Level 1, 2, and 3 fair value assets and liabilities	Quarterly, Q1-Q3 2008	i: significant value relevance of Level 1, 2, and 3 fair value assets and liabilities, however Level 3 fair values are less significant than Level 1 and 2; ii: high corporate governance results in higher value relevance of all three Levels.
Kuiper, I., & Ter Hoeven, R.	2013	Toepassing IFRS 13 fair value measurement door corporates	Corporates' Level 1, 2, and 3 fair value assets and liabilities	Annual, 2013	i: relative size of assets and liabilities valued at fair value is limited with corporates (only 6-7% of balance sheet total; ii: corporates mostly document Level 1 and 2 estimates, not Level 3 estimates.
Goh, B. W., Li, D., Ng, J., & Yong, K. O.	2015	Market pricing of banks' fair value assets reported under SFAS 157 since the 2008 financial crisis	Banks' Level 1, 2, and 3 fair value assets (+ Level 3 gains)	Quarterly, 2008-2011	i: All three fair value asset Levels are value relevant, however Level 3 FV estimates are priced lower than Level 1 and Level 2 FV assets; ii: The difference between the pricing of the different estimates reduces over time due to stabilizing market conditions; iii: pricing of Level 1 and Level 2 asset estimates is lower for banks with lower capital adequacy.

Appendix 3: Variables definitions

Variable	Name	Description
Share Price	PRC	The share price one day after the reporting day of a 10-Q or 10-K.
Fair value Level 1 assets	FVA1	Reported Level 1 assets, deflated by common shares.
Fair value Level 2 assets	FVA2	Reported Level 2 assets, deflated by common shares.
Fair value Level 3 assets	FVA3	Reported Level 3 assets, deflated by common shares.
Fair value Level 1 and 2 liabilities	FVL12	Reported Level 1 plus Level 2 liabilities, deflated by common shares.
Fair value Level 3 liabilities	FVL3	Reported Level 3 liabilities, deflated by common shares.
Non-fair value assets	NFVA	Total assets minus Level 1, 2, and 3 fair value assets, deflated by common shares.
Non-fair value liabilities	NFVL	Total liabilities minus Level 1, 2, and 3 fair value liabilities, deflated by common shares.
Net income	NI	Net income less extraordinary items, deflated by common shares.
Company size	SIZE	The log of total assets at the beginning of the quarter (lagged total assets), divided into deciles.
Company growth	GROWTH	The percentage change in total assets from the beginning of the quarter to the end of the quarter, divided into deciles.
Materiality of fair value disclosure	MAT	Dummy variable; 1 if the total net fair value divided by total net assets is larger than the sample mean, 0 otherwise.
Industry controls	IND	Dummy variables for all industries.

Appendix 4: Linearity plots independent variables