Do Investors Trust Fair Values of Mark-to-Model Financial Instruments?

Evidence from the European Banking Industry

Roni Laakso
M.Sc. (Econ.), M.Sc. (Tech.), Email: roni.laakso@gmail.com

ABSTRACT
The purpose of the study is to analyze whether investors see fair values of mark-to-market financial instruments as more value relevant than fair values of mark-to-model financial instruments. A sample of 98 European publicly listed banks is used to conduct the empirical study. Data on the amount of fair value financial instruments held by the banks is collected from annual reports for fiscal year 2009. We utilize disclosures mandated by the IFRS 7 fair value hierarchy which requires companies to categorize fair value instruments into three levels based on the objectivity of the inputs used in the valuation models. Additional data needed for the regression model is collected from the Thomson Datastream and Thomson Worldscope databases. Results of the empirical study support our hypothesis, i.e. that fair values based on market data are perceived by financial markets as more value relevant than fair values based on valuation models that utilize subjective inputs.

Keywords:
Fair value hierarchy, value relevance, financial instruments, IFRS 7.

1. INTRODUCTION
Fair value accounting has been in the heart of the financial accounting debate for a long time, and due to the recent financial crisis this debate now takes a more central stage. The International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) have both been expanding the use of fair values in financial accounting and this development has at times faced severe opposition. Reporting financial instruments at fair value has been, and still is, one of the biggest issues for the IASB to contend with.

In an optimal setting where markets are complete and perfect all fair values would be determined through directly observable market prices. In such an environment, fair values would automatically fully represent the consensus expectations of the market participants and there would be no need to worry about measurement errors (Kolev, 2008). However, in
reality capital markets are rarely perfect and even previously liquid markets can quickly dry up. This fact will at times necessitate the use of mathematical models in the valuation of financial instruments, and sometimes it will also be necessary to use subjective management assumptions as inputs in these models.

Financial instruments are referred to as *mark-to-market* instruments/assets when they are valued using unadjusted market prices. In contrast, when active markets for these instruments do not exist, and the use of internally generated estimates is necessary, the instruments are termed *mark-to-model* instruments/assets. Mark-to-model estimates utilize management assumptions that are often difficult or even impossible to verify. (Kolev, 2008) The use of mark-to-model estimates serves only as a noisy proxy for the true value\(^1\) of the instruments in question and this provides management with a possibility to intentionally bias the estimates in their own favor. Noise is also caused by unintentional errors in the valuation process. (Ronen, 2008)

Both the FASB and the IASB have made a strong commitment to expanding the use of fair value accounting (Barth, 2006). As the use of fair values has expanded, concerns have emerged about the reliability and relevance of these measures. Opponents of fair value accounting claim that, in contrast to values based on historical costs, fair values are more difficult to verify and they possess a greater risk of significant measurement error, intentional misreporting and manipulation by management (Song et al. 2008). The problems are even greater for mark-to-model assets which are associated with risks stemming from the use of inaccurate models and inputs (Goh et al. 2009). All these problems are claimed to intensify information asymmetries and lead to less reliable financial information (Landsman 2007). In contrast, proponents of the practice argue that fair values provide information that is more relevant to investors and also simplify complicated accounting procedures such as hedge accounting (Song et al. 2008).

A clear problem in the financial crisis was the fact that even though banks were able to provide precise values for financial instruments on their balance sheets, liquidity was still nonexistent (Easley & O’Hara, 2008). One explanation for this dilemma might be that the markets simply did not trust the estimates provided by banks and had a completely different view of the fair values of these assets. To what extent is mark-to-model seen by the users of financial statements as providing valuable information (i.e. value relevant information) remains an empirical question that previous research has not been able to answer comprehensively.

This paper analyzes whether financial markets perceive mark-to-model financial instruments as less value relevant\(^2\) than mark-to-market instruments. We are able to draw reliable conclusions by mainly using information required by the *International Financial Reporting Standard (IFRS) 7 Financial Instruments: Disclosures*. According to IFRS 7, financial instruments that are measured at fair value have to be divided into three different categories based on the observability of the inputs that are used in the valuation process. This

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1. The term “true value” is used to refer to the theoretical equilibrium price for the instrument if perfect markets existed for the instrument in question.

2. This paper defines *value relevance* in the following way: a reported balance sheet item is deemed to be value relevant if it has a statistically significant association with the market value of equity. Value relevance of the information is assumed to be a consequence of the information being both relevant and reliable for financial markets for valuation purposes.
categorization is termed as the *fair value hierarchy*. The hierarchy consists of three different levels. Level 1 includes financial instruments that are valued using quoted prices in active markets for identical assets or liabilities. Level 2 includes instruments that do not have active markets and are therefore valued using models for which all significant inputs are based on observable market data. Level 3 includes instruments that do not have active markets and for which the significant inputs in the valuation models cannot be observed from active markets. As a consequence, Level 3 instruments are most prone to subjective estimations (IFRS 13.723). The three-level hierarchy of IFRS 7 provides a fruitful starting point for empirical research as it enables us to distinguish if the financial markets see mark-to-model assets differently from mark-to-market assets when considering the value relevance of the instruments.

The research contributes to the value relevance literature and to the debate about the relevance and reliability of fair value estimates of financial instruments that are not traded on active markets. The study also provides insights into the possible benefits of different accounting standard approaches concerning financial instruments and may therefore help standard setting bodies in their work. The results will certainly be of interest to a broad audience as the sample consists of large European banks that are currently under a high level of public and regulatory scrutiny.

2. **IFRS 7 FAIR VALUE HIERARCHY**

As a response to the economic turmoil during the financial crisis, and to the heated debate about the use of fair values, the IASB issued an amendment to IFRS 7 (*Improving Disclosures about Financial Instruments – Amendments to IFRS 7 Financial Instruments: Disclosures*) in March 2009 in order to require entities to disclose more information about their use of financial instruments and risks arising from this practice. The goal of the amendment was to provide the users of financial statements a clearer picture of the valuation techniques and methods used and enable them to understand the risks and uncertainty associated with fair value measurement and liquidity risk. Additionally, the amendments aimed at helping to improve comparability between companies with respect to the effects of fair value measurement (IASB, 2009b). The amendment also introduced the concept of a fair value hierarchy.

Entities were required to apply the amendments for annual periods beginning on or after 1 January 2009 with early application permitted. This is six months earlier than was originally proposed (IASB 2009b). The IASB has confirmed that the fair value hierarchy is consistent with the one required by SFAS 157 (IFRS 7.BC39B). This was not the case with the earlier implicit fair value hierarchy in IAS 39⁴. The IASB concluded that these new amendments would further the convergence of IFRS and US GAAP (IASB, 2009b).

In addition to disclosing the level of each financial instrument measured at fair value, the amended IFRS 7 requires companies to disclose information on several other matters

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3. The description of the fair value hierarchy was originally included in IFRS 7.27 but was later transferred to IFRS 13.27.

4. The “implicit fair value hierarchy in IAS 39” refers to the fact that the standard contained a similar distinction of different measurement models but did not explicitly refer to a “fair value hierarchy”.

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relating to the fair value hierarchy. Entities are required to disclose the significant transfers between Level 1 and Level 2 fair value instruments and the reasons for these transfers (IFRS 13.93\textsuperscript{5}). For financial instruments valued using a valuation technique, the accounting policy for recognizing the transaction date difference between the transaction price and the fair value measured using the valuation technique (this difference is called “day one profit or loss”) has to be disclosed (IFRS 7.28). Additional information is required for Level 3 financial instruments (IFRS 13.93\textsuperscript{6}): a reconciliation between the opening and closing balances; and if the fair value would change significantly when one or more inputs were replaced by reasonably possible alternative assumptions, companies are required to disclose the effect of these changes, and also how the effect was calculated.

The fair value hierarchy aims at providing financial statement users with more detailed information about the reliability of the disclosed fair value measurements. The users of financial statements are now able to understand the extent to which fair value measurements depend on subjective and unobservable inputs. In addition, the establishment of a framework for deriving fair values aimed at enhancing external auditors’ possibilities for verifying companies’ fair value measurements. Standard setters are clearly putting increased emphasis on the relevance of information at the expense of its reliability (Fornaro & Barbera, 2007).

According to the amendments, all financial instruments that are measured at fair value have to be classified into a three-level hierarchy. The disclosures that have to be provided about any given financial instrument depend on the hierarchy-level that the instrument is classified into (IFRS 13.27\textsuperscript{7}). The required information must be provided for ‘classes’ of financial instruments, which is a level lower than categories such as held for trading or available for sale (IFRS 7.26). The hierarchy is based on the notion that some fair values are more objective than others are. The objectivity of a given value is based on the observability of the estimates and inputs used in the valuation process. Consequently, the hierarchy focuses more on the inputs used in the valuation techniques than on the techniques themselves. As IFRS 7 does not prioritize the use of any specific valuation method over another a great deal of judgment is required in order to determine the valuation technique to be used.

The three levels of the hierarchy are defined as follows (IFRS 13.76, 13.81, 13.86\textsuperscript{8}):

- **Level 1**: quoted prices in active markets for identical assets or liabilities
- **Level 2**: inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices)
- **Level 3**: inputs for the asset or liability that are not based on observable market data (unobservable inputs)

The level within which a certain financial instrument is categorized is dependent on the lowest level of input in the instrument’s valuation that is significant to the fair value meas-

\textsuperscript{5} The requirement was originally included in IFRS 7.27 but was later transferred to IFRS 13.93.
\textsuperscript{6} The requirement was originally included in IFRS 7.27 but was later transferred to IFRS 13.93.
\textsuperscript{7} The requirement was originally included in IFRS 7.27 but was later transferred to IFRS 13.27.
\textsuperscript{8} The requirement was originally included in IFRS 7.27 but was later transferred to IFRS 13.
urement in its entirety (IFRS 13.73). IFRS 7 does not provide any guidance on how to determine the significance of a given input. In many cases it is appropriate to use sensitivity analysis or stress testing to determine whether an input is significant to the valuation model being used.

3. PRIOR RESEARCH AND HYPOTHESIS DEVELOPMENT

3.1. Value Relevance of Fair Values

Empirical research has provided considerable evidence suggesting that fair values are value-relevant (see e.g. Kolev, 2008). The incremental value of additional disclosures to supplement balance sheet and income statement information has also been found to be positive both in archival and survey studies (Bischof, 2009). Even though off balance sheet information is considered relevant in equity valuation, it is still less relevant than the information contained in the actual financial statements (Ahmed et al. 2006). The studies on value relevance are usually conducted by trying to find an association between the fair value estimates and the stock price, or between the fair value estimates and the stock return. Consequently, the research relies on the underlying assumption that a proven and significant association between the aforementioned variables can be seen as convincing evidence of the reliability and relevance of fair value estimates (Barth et al. 2001). The current study will also rely heavily on this assumption.

Barth (1994) found that fair values seem to provide relevant information to investors in valuing equity, but fair value gains and losses do not appear to be value relevant. She used a sample of US banks and data from 1971-1990 to study how disclosed fair value estimates of investment securities, and securities gains and losses based on those estimates, are reflected in share prices in comparison with historical costs. The findings indicated that fair values provide significant explanatory power beyond that provided by historical costs. Another finding was that historical costs do not provide any significant explanatory power incremental to fair values. The results are mixed when value relevance is analyzed in the context of unrealized gains and losses on fair value securities. Barth assumed that these mixed results are caused by the high levels of measurement error contained in unrealized earnings.

In a related research study, Barth et al. (1996) analyzed the value relevance of fair value estimates of banks’ assets and liabilities disclosed under SFAS 107 in 1992 and 1993. The results showed that fair values provide significant explanatory power for banks’ share prices beyond that provided by related book values. Additionally, loans’ coefficients were found to be significantly larger for banks with higher regulatory capital. This is consistent with the assumption that financial markets discount unrealized gains and losses on loans disclosed by less healthy banks in order to protect themselves against the additional risks involved. According to the authors, the loan values of less healthy banks may be more difficult to estimate which results in more estimation error, and is reflected in the estimated valuation coefficients. Managers of less healthy banks may also have more incentives to overstate unrealized gains and to understate unrealized losses, which deteriorates the mar-

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9 The requirement was originally included in IFRS 7.27 but was later transferred to IFRS 13.73.
kets’ trust in these estimates and induces lower coefficients. Using similar approaches, Eccher et al. (1996) and Nelson (1996) assessed the incremental value relevance of fair values of banks’ assets and arrived at similar conclusions as Barth et al. (1996).

Carroll et al. (2003) analyzed a sample of 143 closed-end mutual funds during 1982-1997 to examine the value relevance of the financial instruments held by these companies. The study found a significant association between stock prices and the fair value of investment securities. In contrast to Barth (1994), a significant association was also found between stock returns and fair value securities gains and losses. Carroll et al. (2003) also examined whether the perceived reliability of fair value financial instruments differs between asset classes. The results showed that even securities traded on thin markets, such as private equities, do not cause the incremental value-relevance of fair value information to disappear.

Hodder et al. (2006) studied the risk relevance of a constructed full-fair-value income measure in comparison to net income and to comprehensive income. The sample used to conduct the study included 202 US commercial banks and quarterly data from 1996 to 2004. The authors found that, on average, the volatility of full-fair-value income was three times that of comprehensive income, and more than five times that of net income. It was also found that the additional volatility of full-fair-value income was positively associated with the market-model beta and the standard deviation in stock returns. The additional volatility of full-fair-value income also positively affected the expected return implicit in banks’ share prices. The findings suggest that full-fair-value income volatility reflects elements of risk that are not captured by the volatility in net income or comprehensive income. As a result, it can be argued that full-fair-value income is more closely related to capital market pricing than the alternative income measures.

Danbolt and Rees (2008) studied the British real estate and investment fund industries in order to compare the value relevance of historical cost and fair value accounting. They found that fair value income is considerably more value relevant than historical cost income. The study also found that fair values are more value relevant for the investment fund industry than for the real estate industry. As the valuation of real estate is arguably more subjective than the valuation of financial instruments, the evidence suggests that fair values become less relevant when the possibilities for earnings management and subjective estimation increase.

Koonce et al. (2010) found that investors’ views on the relevance of fair values depend on whether the financial instrument in question is an asset or a liability. According to the study, investors consider fair values more relevant for assets than for liabilities, even when the underlying economics of the financial instruments are identical. This suggests that markets do not behave as though fair value is a neutral concept. It is also noteworthy that the relevance of disclosed information has been found to differ in relation to country and firm characteristics (see e.g. Ball et al. 2000). In addition, Brown et al. (1999) showed that there have been several occasions where the value relevance of disclosures has changed over time.

In summary, previous research clearly indicates that fair values are more relevant for asset pricing than any of the alternative valuation methods. Additionally, there are clear signs which imply that the value relevance of fair values declines when the possibilities and incentives for misreporting increase.
3.2. Value Relevance of the Fair Value Hierarchy

FASB introduced the concept of a fair value hierarchy to the US GAAP approximately 13 months before the IASB was able to do the same, and most of the studies relating to the value relevance of the fair value hierarchy have been done using samples from the US stock market. We were not able to find any prior research that would have been conducted on European markets and therefore concentrate on the publications based on disclosures required by SFAS 157.

Kolev (2008) uses SFAS 157 mandated disclosures about the different levels of the fair value hierarchy to analyze the value relevance of fair value assets. The author uses a sample of 177 large financial institutions (including banks, financial service companies and insurance companies) listed in the United States, and their quarterly statements from the first two quarters of 2008, to examine whether investor see mark-to-model estimates as less reliable than mark-to-market estimates. As an additional analysis, he studies if the regression coefficients for the fair value assets of different levels are dependent on different company characteristics. These characteristics include the financial expertise of the company's audit committee, the availability of equity capital, and the provider of the valuation models for mark-to-model assets (i.e. the company itself or an independent third party).

Kolev (2008) finds a significant positive association between share prices and net assets measured at fair value, which suggests that fair values are value relevant to investors. While the coefficients of Level 2 and Level 3 assets are consistently lower than those of Level 1 assets, the difference is significant only for Level 3 assets. Based on the additional analyses he finds that the valuation gap between Level 1 and Level 3 assets is greater for companies with less financial expertise on the audit committee, lower equity capital and internally developed valuation models. Nevertheless, even in instances where management's opportunity and implied incentives to influence fair value estimates are evident, the association between mark-to-model assets and share prices remains positive and significant.

Goh et al. (2009) use a very similar setting to Kolev (2008) and analyze whether lower level fair value assets are priced differently from higher level fair value assets. Additional questions that they set out to answer are the effects of Tier 1 capital (i.e. low leverage ratio) and the use of a Big 4 auditor on the market pricing of fair value assets. Their sample consists of 516 banks listed in the United States, and data from the first three quarters of 2008 is used to answer the research questions.

Similar to the findings of Kolev (2008), the results of Goh et al. (2009) suggest that mark-to-model assets are generally priced with lower coefficients than mark-to-market assets. Additional time-series analysis shows that this valuation gap between the different levels of fair value assets increased during the first three quarters of 2008. These findings are consistent with the authors' assumption that the deepening of the financial crisis and the increased market concerns about the loss of liquidity led to increased information risks for mark-to-model assets. The researchers also documents that while investors value Level 2 assets less than Level 1 assets they do not value Level 2 and Level 3 assets differently. These findings contradict the ones made by Kolev (2008) which suggested that there was no significant difference between the valuation of Level 1 and Level 2 assets. The results of Goh et al. (2009) also confirm the assumptions that mark-to-model assets are priced higher for banks with better capital adequacy ratios and better auditors (i.e. Big 4 auditors).
A third study on the fair value hierarchy has been conducted by Song et al. (2008). Similar to Goh et al. (2009), the authors use a sample of quarterly reports from US listed banks for the first three quarters of 2008. Even though the authors’ first hypothesis is quite similar to the previously discussed two studies, their second hypothesis provides a new perspective on the subject. In this second research question, they set out to analyze whether the level of corporate governance in the company has an effect on the value relevance of the different levels of fair value instruments. In order to analyze the effects of corporate governance the authors create a corporate governance index for the purpose of the study. This index allocates points to companies based on the perceived strength of their corporate governance mechanisms. Factors taken into account in the calculation of the index include board independence, audit committee financial expertise, frequency of annual audit committee meetings and percentage of shares held by institutional investors.

According to the researchers, the relevance of Level 1 and Level 2 instruments declines only marginally when the company has low level corporate governance mechanisms. In contrast, for Level 3 assets the decline in relevance caused by bad corporate governance is more significant. For companies included in the lowest decile of the corporate governance index the valuation coefficient of Level 3 assets is close to zero, suggesting that investors see these assets as having no value at all. The results show that strong corporate governance clearly reduces information asymmetries and enhances investor confidence in internally generated valuation models.

Song et al. (2008) also study if the relatively new fair value hierarchy provides incrementally value relevant information in comparison to the type of information of financial instruments (investment securities, derivative assets, loans, other assets, trading liabilities, long-term debt, derivative liabilities and other liabilities) that was already previously required by SFAS 157. The authors find evidence supporting their hypothesis that the fair value hierarchy has made asset disclosures incrementally more value relevant.

Even though Kolev (2008) and Goh et al. (2009) found that the valuation coefficients for Level 2 and Level 3 assets were significantly less than the theoretical value of one, Song et al. (2008) report that these coefficients are close to the value of one. This would suggest that investors do not discount mark-to-model assets but rather accept them at the reported fair value. In contrast to the results of Goh et al. (2009), Song et al. (2008) find that the value relevance of fair value assets did not decrease during 2008 but instead remained stable. This would indicate that the value relevance of fair values does not decrease as markets become more illiquid. Supporting the findings of Kolev (2008), Song et al. (2008) also find that Level 1 and Level 2 assets are valued similarly while Level 3 assets are valued with significantly smaller coefficients.

The reviewed literature clearly indicates that all levels of the fair value hierarchy are seen by investors as value relevant. Another common finding is that the value relevance of Level 1 assets is stronger than the value relevance of Level 3 assets. The results on the value relevance of Level 2 assets are mixed. Previous research also suggests that company characteristics can have a significant effect on the perceived value relevance of fair values. Based on the surveyed literature the following hypotheses are formed (stated in the alternative form):

**Hypothesis No. 1:** All levels of fair value estimates are positively related with market value of equity.
Hypothesis No. 2: The positive association between fair value instruments and market value of equity is lower for mark-to-model financial instruments (i.e. Level 3 instruments) than for mark-to-market financial instruments (i.e. Level 1 instruments).

4. SAMPLE SELECTION AND RESEARCH METHODOLOGY

4.1. Sample Selection

The sample used in the study consists of European publicly listed financial institutions that have a SIC-code beginning with the numbers 60 or 61. The SIC code 60 refers to depositary financial institutions and the SIC code 61 refers to non-depositary financial institutions. The sample is extracted from the Thomson One Banker database. This initial definition yields a sample of 293 companies.

Companies that do not have a fiscal year that is equal to the calendar year are eliminated from the sample. This is done in order to not allow general market movements to distort the found associations. Additionally, companies that do not provide financial statement information for fiscal year 2009 in English, Finnish, Swedish or German are eliminated from the sample. Companies that have been acquired during the period are also eliminated from the sample. Next, companies that do not comply with the fair value hierarchy of IFRS 7 or do not provide the required information in a clear and understandable manner are eliminated from the sample. In the following step, companies for which all inputs needed in the regression model are not provided by the Thomson Financial Datastream or Thomson Financial Worldscope databases are eliminated from the sample. Finally, companies with clear errors in the collected data are eliminated (e.g. total fair value assets greater than total assets). This yields a final sample of 98 companies. Table 1 illustrates the sample selection process.

Table 1. Sample selection

<table>
<thead>
<tr>
<th>Steps</th>
<th>Change</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>All companies with SIC codes 60 or 61</td>
<td>+293</td>
<td>293</td>
</tr>
<tr>
<td>Companies eliminated due to unconventional fiscal year</td>
<td>−29</td>
<td>264</td>
</tr>
<tr>
<td>Companies eliminate due to lack of financial statement information in English, Finnish, Swedish or German</td>
<td>−84</td>
<td>180</td>
</tr>
<tr>
<td>Companies eliminated due to acquisition during the period</td>
<td>−1</td>
<td>179</td>
</tr>
<tr>
<td>Companies eliminated due to lack of fair value hierarchy information</td>
<td>−60</td>
<td>119</td>
</tr>
<tr>
<td>Companies eliminated due to lack of regression inputs</td>
<td>−5</td>
<td>114</td>
</tr>
<tr>
<td>Companies eliminated due to errors in data</td>
<td>−16</td>
<td>98</td>
</tr>
<tr>
<td>Final sample</td>
<td></td>
<td>98</td>
</tr>
</tbody>
</table>

Data on the amount of fair value financial assets and liabilities included in the three levels of the fair value hierarchy is collected from the annual reports for fiscal year 2009. All other
variables needed for the regression model are collected from the Thomson Financial Datastream and Thomson Financial Worldscope databases.

4.2. Research Methodology

A regression model based on previous literature by Kolev (2008), Song et al. (2008) and Goh et al. (2009) is used to answer the research questions. All of the aforementioned authors use similar regression models to analyze the value relevance of the different levels of the fair value hierarchy. The regression models are based on the same basic principle which is presented by the following regression equation:

\[
\text{Price} = \alpha + \beta_1 \cdot \text{FairValueAssets} + \beta_2 \cdot \text{NetBookEquity} + \beta_3 \cdot \text{Controls} + \epsilon
\]

The dependent variable is the quoted market price of the company's shares. \(\alpha\) represents the regression constant while \(\epsilon\) represents the error term (i.e. the variance in the dependent variable that is not predicted by the regression equation). The equation includes two independent variables: financial instruments valued at fair value and net book equity. Net book equity is defined in all of the research papers as book value of equity subtracted with net fair value assets. The control variables included in the equation differ between researchers but all of the authors include profitability as one of the control variables. This is why profitability was chosen as the control variable in this study as well. Furthermore, in preliminary runs of the regression model it was found that additional control variables did not provide the regression equation with any significant additional explanatory power.

4.3. Regression Model

Our regression model divides fair value assets into three different variables which represent the three different levels of the fair value hierarchy. Assets and liabilities are aggregated at each level because liabilities account only for a small portion of total fair value instruments\(^{10}\). We expect that if liabilities were treated as separate variables the regression coefficients would be statistically insignificant because of the limited availability of data. The regression model enables us to understand whether investors perceive the three levels of fair values as being value relevant and whether there are differences between the perceived value relevance of the different fair value levels. The regression equation is presented below:

\[
\text{Price} = \alpha + \beta_1 \cdot \text{Level1} + \beta_2 \cdot \text{Level2} + \beta_3 \cdot \text{Level3} + \beta_4 \cdot \text{NETBE} + \beta_5 \cdot \text{Profitability} + \epsilon
\]

Where:
- Price per share on the 31\(^{st}\) of March\(^{11}\)
- \(\alpha\) Intercept
- \(\beta_1 - \beta_6\) Regression coefficients

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10. See subchapter 5.1 Descriptive Statistics for more details.
11. The markets are given 30 days to effectively transfer the information included in the annual report into the share prices (see e.g. Biddle et al. 1997, Beaver et al. 2007, Entwistle et al. 2010 and Barth et al. 1998).
4.4. Limitations of Research

The research does not provide any information on the value relevance of the fair value hierarchy to financial statement users that are not equity investors. However, the research clearly set out to analyze value relevance only from the perspective of equity markets. Results could also be questioned based on the assumption that investors in Europe might not yet be familiar enough with the fair value hierarchy and could as a result find the information hard to interpret.

The sample selection methodology suffers from the possibility that some companies might be subsidiaries of other sample companies. This might lead to companies being accounted for twice in the regression model which could distort the results of the analysis. In spite of this, the problem is not seen as too severe to significantly decrease the reliability of the results. Furthermore, because the sample is constructed from companies with SIC-codes beginning with the numbers 60 or 61 it has to be noted that the sample includes, in addition to banks, companies that have significant financing operations but are not considered as banks (e.g. BMW, Audi, Carrefour, Deutsche Post). In these cases, the SIC-codes 60 and 61 are not the main SIC-classifications of the companies. Such companies have not been removed from the sample as their identification would have required a significant amount of judgment to be used, and the aim of the paper was to keep the sample selection process as objective as possible.

As previously mentioned, the data on the amount of fair value assets held by banks was collected by hand from annual reports. Consequently, a possibility of human error obviously exists. To gain sufficient confidence with regard to the completeness and accuracy of the collected data, a haphazard sample of 10 companies was selected (10 percent of the final sample) and the data for these companies was recollected. No errors were found during the haphazard sampling procedure which indicates that the data is reliable.

The time frame of the study is confined to only one year which might limit the generalizability of the results. It is not known if the financial crisis had an effect on the found associations and whether the results of the regression model would have been different if the sample data was collected in a more stable economic environment. The small sample size also creates its limitations for the generalizability of the results. Another factor worth considering is the limited industry coverage of the study. While financial institutions are the main users of financial instruments this limitation in the sample creates uncertainty about the possibilities of generalizing the results into other industries.

There are also two additional limitations which are common to equity value regressions. One is that the tests cannot distinguish between relevance and reliability. If no statistically significant association is found between the fair values of certain assets and the market value of equity, does this indicate that the financial markets do not find the fair values in
question relevant, or are the reported values not reliable? The models used in the current
research, and in similar studies, are not able to make a distinction between these two pos-
sibilities. Another common weakness in value relevance studies is that the assets which
represent the core economic value of firms may not be balance sheet items making it diffi-
cult to control for their effect on equity values. Omitted off-balance-sheet items that are
correlated with the reported fair values will bias the estimated relation between market
equity values and the reported fair values. (O’Brien, 2005)

Finally, the methodology of the paper aims at determining the value relevance of the
different levels of the fair value hierarchy based on the regression coefficients of assets allo-
cated to these different categories. The differences in the coefficients can be caused by per-
ceived differences in the used valuation models (i.e. mark-to-market vs. mark-to-model).
However, it is important to note that another possibility is that the differences in the coeff-
icients are caused by the inherent differences in the instruments themselves or their mar-
kets. The methodology used in the paper is unable to distinguish between the effects of
these two variables. Presumably, both of them will have an effect on the observed regres-
sion coefficients.

5. RESULTS

5.1. Descriptive Statistics

To compute the descriptive statistics all currencies were translated into Euros based on the
foreign exchange reference rates for 31 December 2009 provided by the European Central
Bank (2010). The total assets of the average sample company are €180.3 billion (median
€29.4 billion). The average of total liabilities is €170.6 billion (median €27.3 billion).
Accordingly, the average ratio of total liabilities to total assets is 89.31 percent (median
93.25 percent). The sample companies have a notably larger portion of assets than liabili-
ties recognized at fair value. For the average company, fair value assets account for 25.65
percent of total assets while fair value liabilities account for 10.22 percent of total liabilities
(median 18.96 percent versus 3.37 percent). The average amount of fair value assets is
€67.8 billion while the average amount of fair value liabilities is €41.3 billion (median €4.6
billion versus €0.7 billion).

For the average sample company, the majority of fair value assets consist of Level 1
instruments which account for 54.00 percent of total fair value assets (median 56.93 per-
cent). Level 2 instruments are a close second with 39.35 percent of total fair value assets
(median 35.08 percent). With 6.65 percent, Level 3 assets clearly account for the smallest
portion of total fair value assets (mean 1.69 percent). For the average sample company,
Level 1 liabilities account for 15.68 percent of total fair value liabilities (median 0.44 per-
cent), while Level 2 fair value liabilities account for 78.36 percent of total fair value liabili-
ties (median 95.49 percent). The median sample company holds only 5.96 percent Level 3
fair value liabilities of the total amount of fair value liabilities (median 0.00 percent).

It should also be noted that the average book value of equity per share is €27.11 while
the average of net fair value assets per share is €55.55. Therefore, the average net book value
of equity (regression variable NETBE), which is defined as book value of equity subtracted
by net fair value assets, will receive a negative value in the regression model. This has to be
taken into account when interpreting the results of the regression model. Appendix 4 pro-
vides more detailed information about the descriptive statistics collected from the final
sample of 98 companies.

5.2. Regression Analysis

Table 2 presents Pearson correlation coefficients for the variables used in the regression
model. The only statistically significant strong correlation (i.e. r > .70 or r < −.70) can be
found between variables NETBE and Level1 (−0.806). Because Level 1 instruments account
for the largest portion of net fair value assets and NETBE is defined as book equity sub-
tracted with net fair value assets, it is understandable that the variables NETBE and Level1
have a strong negative correlation. Moderate correlations (i.e. r is between .30 and .70 or
between −.30 and −.70) and weak correlations (i.e. r is between .0 and .30 or between 0 and
−.30) can be found between several of the other variables. We assume that multicollinearity
will not be a severe problem as there was only one instance of strong correlation between
the independent variables and this correlation had an understandable explanation. This
conclusion is also supported by the collinearity statistics in table 3, which will be examined
more closely in the paragraphs below.

When we examine the correlations between Price and the different levels of fair values
we find preliminary supportive evidence for our first and second hypotheses. The correla-
tion table shows that there is significant correlation between Price and Level1 and between
Price and Level2. However, no significant correlation is found for Price and Level3. These
results indicate that at least the first two levels of the fair value hierarchy are value relevant.
From the correlation table, it can also be clearly seen that the correlation coefficient is
much larger for Level1 and Price than for Level3 and Price (0.561 versus 0.082). This gives
preliminary supportive evidence for hypothesis 2 and indicates that mark-to-market fair
values have a stronger relation with the market value of equity in comparison to mark-to-
model fair values.
Table 2. Pearson correlations

<table>
<thead>
<tr>
<th>Pearson correlations</th>
<th>Price</th>
<th>Level1</th>
<th>Level2</th>
<th>Level3</th>
<th>NETBE</th>
<th>Profitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level1</td>
<td>.561**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level2</td>
<td>.301**</td>
<td>.106</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.001)</td>
<td>(.149)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level3</td>
<td>.082</td>
<td>.538**</td>
<td>-.044</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.210)</td>
<td>(.000)</td>
<td>(.335)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NETBE</td>
<td>-.364**</td>
<td>-.806**</td>
<td>-.556**</td>
<td>-.561**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.000)</td>
<td>(.000)</td>
<td>(.000)</td>
<td>(.000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profitability</td>
<td>.613**</td>
<td>-.182*</td>
<td>.090</td>
<td>-.354**</td>
<td>.322**</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(.000)</td>
<td>(.037)</td>
<td>(.189)</td>
<td>(.000)</td>
<td>(.001)</td>
<td></td>
</tr>
</tbody>
</table>

** correlation is significant at the 0.01 level
* correlation is significant at the 0.05 level

The numbers in brackets below the correlation coefficients represent p-values.

Table 3 presents the collinearity statistics for the regression model. As the values for the condition index are significantly smaller than the critical value of 30 (serious multicollinearity), we find supportive evidence for our previous inference that there are no significant problems with multicollinearity in the regression model. As all the values for the condition index are also below the critical value of 15 (possible multicollinearity), we can be confident that no multicollinearity exists in our regression model.

Table 3. Collinearity statistics

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Eigenvalue</th>
<th>Condition Index</th>
<th>Variance Proportions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(Constant)</td>
<td>NETBE</td>
</tr>
<tr>
<td>1</td>
<td>2.709</td>
<td>1.000</td>
<td>.02</td>
</tr>
<tr>
<td>2</td>
<td>1.74</td>
<td>1.404</td>
<td>.09</td>
</tr>
<tr>
<td>3</td>
<td>.831</td>
<td>1.806</td>
<td>.30</td>
</tr>
<tr>
<td>4</td>
<td>.660</td>
<td>2.026</td>
<td>.49</td>
</tr>
<tr>
<td>5</td>
<td>.401</td>
<td>2.599</td>
<td>.03</td>
</tr>
<tr>
<td>6</td>
<td>.026</td>
<td>10.198</td>
<td>.06</td>
</tr>
</tbody>
</table>
We check the homoscedasticity and normality of residuals for the regression model by plotting the p-p plot of the standardized residuals and predicted values. The results are presented in figure 1. The plot indicates that our regression model includes no significant tendency in the error terms. However, moderate tendency in error terms might be present. This does not invalidate our regression but it should be taken into account when interpreting results.

Figure 1. Normal P-P Plot of standardized residuals and predicted values.

Table 4 provides a model summary of the regression model. The results show that the regression equation is able to predict most of the variation in the dependent variable. Based on the R-square value, the independent variables are able to predict 89.8 percent of the total variation in the share prices of the sample companies. The explanatory power of the model can therefore be considered as good. The explanatory power of the model is also better than in the previous studies by Kolev (2008), Song et al. (2008) and Goh et al. (2009) which found R-square values ranging from 45.9 to 83.8 percent. The adjusted R-square value tells us that if the regression model was derived from the whole population instead of a sample the independent variables would be able to account for 89.2 percent of the total variation in the dependent variable. The difference compared to the R-square value is very small (0.6 percent) which indicates that the sample is representative of the total population.

Table 4. Model summary

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Durbin-Watson</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.947</td>
<td>.898</td>
<td>.892</td>
<td>33.40487</td>
<td>1.663</td>
<td>161.309</td>
<td>.000</td>
</tr>
</tbody>
</table>

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Table 4 also provides the F-test for the regression model. The F-test has the null hypothesis that there is no linear relationship between the dependent variable and the independent variables (i.e. \( R^2 = 0 \)). The p-value for the F-test indicates that the regression model is statistically significant at the 1 percent level. To test for autocorrelation (i.e. whether residuals are correlated), we analyze the Durbin-Watson test statistic in table 4. The Durbin-Watson value is 1.663 which is between the two critical values of 1.5 and 2.5. As a result, we can assume that there is no significant first order linear autocorrelation in our regression data. Nevertheless, the value is different from the optimal value of 2 which would indicate that there is absolutely no autocorrelation in the data. The total absence of autocorrelation does not invalidate our regression model but it should be taken into account when interpreting the results of the model.

Table 5 presents the regression coefficients for the independent variables in the regression model. The p-values indicate that the coefficients of all the variables are statistically significant. However, Level3 is significant only at the 5 percent level while all of the other variables are significant at the 1 percent level. This difference in the significance levels might be caused by the fact that the average sample company has less Level 3 instruments than instruments in the other levels of the fair value hierarchy. This makes it harder for the model to predict correlation coefficients for the variable in question.

### Table 5. Regression coefficients

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>2.865</td>
<td>3.827</td>
<td>.749</td>
<td>.456</td>
</tr>
<tr>
<td>NETBE</td>
<td>.363</td>
<td>.074</td>
<td>.725</td>
<td>4.886</td>
</tr>
<tr>
<td>Profitability</td>
<td>6.694</td>
<td>.531</td>
<td>.575</td>
<td>12.603</td>
</tr>
<tr>
<td>Level1</td>
<td>.602</td>
<td>.053</td>
<td>1.137</td>
<td>11.365</td>
</tr>
<tr>
<td>Level2</td>
<td>.466</td>
<td>.073</td>
<td>.537</td>
<td>6.411</td>
</tr>
<tr>
<td>Level3</td>
<td>.377</td>
<td>.180</td>
<td>.105</td>
<td>2.096</td>
</tr>
</tbody>
</table>

The regression coefficients for the independent variables are as follows: NETBE 0.363; Profitability 6.694; Level1 0.602; Level2 0.466 and Level3 0.377. It can be clearly seen that the regression coefficients for the three levels of the fair value hierarchy and for the non-fair-value instruments are different from their theoretical value of 1. If markets were perfect a one euro increase in any of these variables would cause the share price to increase by one euro as well. As a result, the coefficients would be equal to 1 in efficient markets. It is understandable that as markets are imperfect they are forced to discount all of the aforementioned assets. However, in comparison to the results of Kolev (2008), Song et al. (2008) and Goh et al. (2009), the coefficients are significantly smaller. The aforementioned authors reported coefficients that were much closer to the theoretical value of 1. For example, Song et al. (2008) found the regression coefficients for the three levels of the fair value hierarchy to range from 0.683 to 0.968. This difference in the results is likely to be caused...
by the fact that while the samples in previous research have consisted solely of actual banks, the sample in this study also includes companies that do not consider banking as their main business even though they have significant financing operations\(^\text{12}\). While there is generally a relatively strong relationship between the market and the book value of equity in the banking sector this might not be the case for other industries. Therefore, a sample with broader industry coverage is expected to have a lower association between the market and book values of equity.

All of the coefficients for the independent variables are positive. This finding provides support for our first hypothesis which stated that all levels of fair value assets are positively related with the market value of equity. The coefficient for Level1 is significantly larger than the coefficient for Level3 (0.602 versus 0.377) which gives support for our second hypothesis. The second hypothesis stated that the value relevance of Level 1 instruments is greater than the value relevance of Level 3 instruments. Additionally, the coefficient of Level2 (0.466) is ranked between the two aforementioned variables which is reasonable if one assumes that Level 2 fair values are more subjective than Level 1 fair values but less subjective than Level 3 fair values. The regression coefficients also indicate that non-fair-value assets are perceived by investors as less value relevant than all levels of fair value assets (regression coefficient 0.363). This is quite surprising as it would mean that even the most subjective fair value estimates are more value relevant than estimates that are not based on fair values. However, the difference between the regression coefficients of NETBE and Level3 are only minor.

To control for the possible effect of outliers the Cook’s distance was calculated for each of the sample companies. The observations with a Cook’s distance value of over 1 were removed from the sample (4 observations) and the regression model was recalculated. While there were minor changes to the coefficients of the independent variables the conclusions drawn were not affected by this procedure. Hypotheses 1 and 2 received supporting evidence despite the elimination of these outliers.

### 6. SUMMARY AND CONCLUSIONS

The purpose of the study was to analyze whether financial markets perceive fair values of mark-to-model financial instruments as less value relevant than the fair values of mark-to-market financial instruments. The question was motivated by the financial crisis and the mistrust in the valuation models used by banks which was evident in the public discourse. The motivation also stemmed from the fact that international standard setting bodies (i.e. IASB and FASB) have been advocating strongly for a more extensive use of fair values in financial accounting. We wanted to explore whether fair values are seen as value relevant even if significant subjective estimates are used. This is a critical question for the fair value accounting debate and is of central importance to the work of the standard setting bodies.

The empirical portion of the study set out to answer the main research question by analyzing the value relevance of financial instruments categorized into the three different lev-

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12. For more details about the limitations caused by the sample selection methodology see chapter 4.4 **Limitations of Research.**
els of the IFRS 7 fair value hierarchy. Additional analysis was performed in order to examine whether certain company characteristics (i.e. leverage ratio and size) had an effect on the value relevance of subjective valuation models. The study was heavily influenced by previous research by Kolev (2008), Song et al. (2008) and Goh et al. (2009) who also analyzed the value relevance of the fair value hierarchy in similar settings. However, there was one significant difference between this study and the previously conducted research. While the previous research had been conducted with samples from the US market, the current study relied on a sample taken from the European markets. In addition, all of the previous literature relied on disclosures mandated by the USGAAP, while the current study utilized information required by the IFRS.

The empirical study provided supporting evidence for the assumption that mark-to-model fair values are perceived by markets as less value relevant than mark-to-market fair values. This assumption was corroborated by the results of the regression model which indicated that there was a clear difference between the value relevance of Level 1 and Level 3 assets in favor of the former. As expected, the results showed that in terms of value relevance, Level 2 assets were situated between the other two levels of the fair value hierarchy. The regression coefficient for Level 3 instruments was found to be positive and statistically significant which suggests that all levels of the fair value hierarchy are value relevant and are reflected in the market value of equity. The results are consistent with the findings of Kolev (2008), Song et al. (2008) and Goh et al. (2009) who all found a significant difference between the valuation coefficients of Level 1 and Level 3 instruments. All of the aforementioned authors also found Level 3 instruments to be value relevant. Even though the final conclusions were similar to the ones drawn in previous research, there were small differences in the estimated coefficients (e.g. in general the coefficients were found to be smaller than in previous research). These differences can be mainly attributed to the differences in the used data.

The current study also found that the regression coefficient for non-fair-value assets was smaller than for any of the levels of the fair value hierarchy. This suggests that even the most subjective fair value estimates have a more significant effect on the market value of equity than the assets that are not measured at fair value. This finding contradicts the findings of Song et al. (2008) who found that Level 3 instruments were perceived by investors as less value relevant than non-fair-value instruments. The findings of Kolev (2008) and Goh et al. (2009) were contradictory on this issue. In some of the studied quarters, Level 3 instruments were found to be less value relevant than non-fair-value instruments while the results from other quarters suggested the opposite.

In sum, the findings of the study suggest that mark-to-market fair values are perceived by financial markets as more value relevant than mark-to-model fair values. This implies that the March 2009 amendments to IFRS 7 have been able to increase the amount of value relevant information available to investors. This indicates that financial markets have become more efficient as a consequence of the new amendments, which in turn provides incentives for the standard setters to continue to develop accounting standards that provide investors with more detailed information about the use of fair values.

In addition, we found some preliminary evidence supporting the assumption that even fair values which are based on the most subjective estimates are perceived by financial mar-
kets as more value relevant than non-fair-value assets. This would give standard setters an even stronger incentive to expand the use of fair values if the results were not contradictory to the findings of some of the previous research. It is also important to note that the characteristics of fair value assets differ from the characteristics of non-fair-value assets, and this fact will presumably affect the instruments’ value relevance. Therefore, the measurement model is not the only variable affecting the value relevance of the instruments.

We find several possibilities for further research on the subject. The results of our study could be questioned because of the problems caused by the small sample size. Our regression model suffered from moderate autocorrelation and we assume that this might be caused by the small sample size. For this reason, it would be beneficial to conduct similar studies with larger sample sizes as this would provide more reliable results for the research questions that have been addressed by this study. The debate on fair values will without doubt continue in the future and more reliable results from European markets would certainly be of assistance to the work of the IASB. The use of larger samples would also allow researchers to distinguish between assets and liabilities in their regression models. Researchers would be able to determine if investors perceive fair values of liabilities as less value relevant than the fair values of assets. Relations of this kind have been suggested by some of the previous literature (see e.g. Koonce et al. 2010).

Further studies could also analyze the different levels of the fair value hierarchy from the viewpoint of other industries besides banks. Companies involved in the commodity business could, for example, provide a fruitful ground for research as these companies are often involved with complex financial instruments because of their hedging needs. The effects of corporate governance on the value relevance of the fair value hierarchy could also be analyzed in a European context. Song et al. (2008) have already conducted such research on the US markets but it would be interesting to know whether their findings hold for European data as well. Time-series analysis on the value relevance of different levels of the fair value hierarchy in the European markets could also be of interest to several researchers. Especially, a time span that covers both the financial crisis and the period after the crisis would probably provide interesting results. In addition, it would be interesting to know how the different events of the financial crisis affected the value relevance of the fair value hierarchy. As a final suggestion for further research, we propose that research should be conducted on the possible differences between countries with regard to the value relevance of the fair value hierarchy.
## APPENDIX I: DESCRIPTIVE STATISTICS

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. Obs</th>
<th>Mean</th>
<th>StDev</th>
<th>25th Prctl</th>
<th>50th Prctl</th>
<th>75th Prctl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Assets (1000€)</td>
<td>98</td>
<td>180 268 988</td>
<td>395 348 752</td>
<td>8 525 857</td>
<td>29 435 525</td>
<td>128 464 595</td>
</tr>
<tr>
<td>Total Liabilities (1000€)</td>
<td>98</td>
<td>170 552 018</td>
<td>378 930 661</td>
<td>7 577 171</td>
<td>27 354 300</td>
<td>121 158 187</td>
</tr>
<tr>
<td>Level 1 Assets (1000€)</td>
<td>98</td>
<td>23 698 136</td>
<td>57 963 743</td>
<td>395 805 260</td>
<td>2 379 818</td>
<td>13 517 589</td>
</tr>
<tr>
<td>Level 2 Assets (1000€)</td>
<td>98</td>
<td>41 602 124</td>
<td>134 934 083</td>
<td>478 248 890</td>
<td>1 702 421</td>
<td>11 703 778</td>
</tr>
<tr>
<td>Level 3 Assets (1000€)</td>
<td>98</td>
<td>2 536 200</td>
<td>8 137 124</td>
<td>2 740</td>
<td>88 856</td>
<td>717 950</td>
</tr>
<tr>
<td>Level 1 Liabilities (1000€)</td>
<td>98</td>
<td>5 268 591</td>
<td>16 752 465</td>
<td>0</td>
<td>4 419</td>
<td>921 394</td>
</tr>
<tr>
<td>Level 2 Liabilities (1000€)</td>
<td>98</td>
<td>34 522 295</td>
<td>116 136 249</td>
<td>75 250</td>
<td>523 810</td>
<td>5 426 725</td>
</tr>
<tr>
<td>Level 3 Liabilities (1000€)</td>
<td>98</td>
<td>1 557 210</td>
<td>6 362 209</td>
<td>0</td>
<td>0</td>
<td>91 184</td>
</tr>
<tr>
<td>Total Fair Value Assets (1000€)</td>
<td>98</td>
<td>67 836 460</td>
<td>189 600 460</td>
<td>1 199 379</td>
<td>4 631 485</td>
<td>31 262 500</td>
</tr>
<tr>
<td>Total Fair Value Liabilities (1000€)</td>
<td>98</td>
<td>41 348 096</td>
<td>131 838 956</td>
<td>116 395</td>
<td>724 473</td>
<td>8 558 023</td>
</tr>
<tr>
<td>Total Non Fair Value Assets (1000€)</td>
<td>98</td>
<td>112 432 528</td>
<td>221 211 533</td>
<td>5 671 761</td>
<td>20 637 912</td>
<td>105 784 000</td>
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<td>Total Non Fair Value Liabilities (1000€)</td>
<td>98</td>
<td>129 203 922</td>
<td>264 451 072</td>
<td>7 035 670</td>
<td>25 184 258</td>
<td>100 437 701</td>
</tr>
<tr>
<td>Total Liabilities/Total Assets</td>
<td>98</td>
<td>89,31 %</td>
<td>12,74 %</td>
<td>90,87 %</td>
<td>93,25 %</td>
<td>95,18 %</td>
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<tr>
<td>Level 1 Assets/Total Assets</td>
<td>98</td>
<td>13,39 %</td>
<td>13,25 %</td>
<td>4,44 %</td>
<td>9,57 %</td>
<td>17,14 %</td>
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<tr>
<td>Level 2 Assets/Total Assets</td>
<td>98</td>
<td>10,39 %</td>
<td>13,59 %</td>
<td>1,97 %</td>
<td>6,07 %</td>
<td>12,93 %</td>
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<td>Level 3 Assets/Total Assets</td>
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<td>1,86 %</td>
<td>8,14 %</td>
<td>0,04 %</td>
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<td>0,02 %</td>
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<td>13,05 %</td>
<td>0,74 %</td>
<td>2,10 %</td>
<td>8,74 %</td>
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<tr>
<td>Level 3 Liabilities/Total Liabilities</td>
<td>98</td>
<td>1,27 %</td>
<td>9,90 %</td>
<td>0,00 %</td>
<td>0,00 %</td>
<td>0,12 %</td>
</tr>
<tr>
<td>Level 1 Assets/Total Fair Value Assets</td>
<td>98</td>
<td>54,00 %</td>
<td>27,12 %</td>
<td>35,91 %</td>
<td>56,93 %</td>
<td>73,29 %</td>
</tr>
<tr>
<td>Level 2 Assets/Total Fair Value Assets</td>
<td>98</td>
<td>39,35 %</td>
<td>26,52 %</td>
<td>17,82 %</td>
<td>35,08 %</td>
<td>58,89 %</td>
</tr>
<tr>
<td>Level 3 Assets/Total Fair Value Assets</td>
<td>98</td>
<td>6,65 %</td>
<td>14,59 %</td>
<td>0,16 %</td>
<td>1,69 %</td>
<td>5,80 %</td>
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<tr>
<td>Level 1 Liabilities/Total Fair Value Liabilities</td>
<td>98</td>
<td>15,68 %</td>
<td>26,22 %</td>
<td>0,00 %</td>
<td>0,44 %</td>
<td>16,03 %</td>
</tr>
<tr>
<td>Variable</td>
<td>No. Obs</td>
<td>Mean</td>
<td>StDev</td>
<td>25th Prctl</td>
<td>50th Prctl</td>
<td>75th Prctl</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------</td>
<td>--------</td>
<td>---------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>Level 2 Liabilities/Total Fair Value Liabilities</td>
<td>98</td>
<td>78.36 %</td>
<td>31.64 %</td>
<td>63.64 %</td>
<td>95.49 %</td>
<td>100.00 %</td>
</tr>
<tr>
<td>Level 3 Liabilities/Total Fair Value Liabilities</td>
<td>98</td>
<td>5.96 %</td>
<td>17.45 %</td>
<td>0.00 %</td>
<td>0.00 %</td>
<td>1.50 %</td>
</tr>
<tr>
<td>Fair Value Assets/Total Assets</td>
<td>98</td>
<td>25.65 %</td>
<td>21.15 %</td>
<td>10.74 %</td>
<td>18.96 %</td>
<td>34.09 %</td>
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<tr>
<td>Fair Value Liabilities/Total liabilities</td>
<td>98</td>
<td>10.22 %</td>
<td>17.36 %</td>
<td>1.03 %</td>
<td>3.37 %</td>
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<td>Level 1 Assets/share</td>
<td>98</td>
<td>44.65</td>
<td>83.25</td>
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<td>14.02</td>
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<td>Level 2 Assets/share</td>
<td>98</td>
<td>50.81</td>
<td>149.45</td>
<td>1.53</td>
<td>7.62</td>
<td>25.50</td>
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<td>98</td>
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<td>19.05</td>
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<td>-0.18</td>
<td>1.19</td>
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<td>96.66</td>
<td>3.67</td>
<td>12.57</td>
<td>60.73</td>
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<td>Non Fair Value Assets/share</td>
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<td>615.40</td>
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<td>70.29</td>
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<td>9.85</td>
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<td>63.11</td>
<td>4.01</td>
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<td>0.66</td>
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REFERENCES


