FAIR VALUE HIERARCHY IN FINANCIAL INSTRUMENT DISCLOSURE. IS THERE TRANSPARENCY FOR INVESTORS? EVIDENCE FROM THE BANKING INDUSTRY

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Abstract

The debate on fair value accounting is still open although the last 20 years have been spent in looking for solutions by academics, practitioners and institutions. After long and continuous discussion both on the basic concepts and the information level contained in fair value measurements and on the different solutions that are possible to adopt in mark to market measurements, IASB and FASB have recently issued new standards on fair value measurements applying some principles not only to financial instruments but also to property and other investments. To verify if the solutions adopted in these Standards really improve the disclosure level and the "usefulness of data for investors", this paper analyzes the actual level of transparency and the "usefulness" of the "fair value hierarchy" (which from some points of view synthesized the Board's way of thinking regarding to fair value) which has already been introduced for financial instruments by IFRS 7, Financial Instruments: Disclosure.
The paper presents results of an empirical investigation on a sample of domestic and foreign listed banks that adopted fair value hierarchy in line with SFAS 157 and IFRS 7 recommendations. Research questions can be summarized as follows: (i) does fair value hierarchy improve transparency in financial instrument evaluation in bank annual reports, or can it be considered as a tool for earnings management?

Keywords: Fair Value Hierarchy, Fair Value Measurement, IFRS7, Disclosure Requirements

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1. Introduction

During this period of global markets, multinational corporations are demanding financial accounting standards with enhanced uniformity. In an effort to achieve this objective, the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) have been working together on the Convergence Project, aiming to develop accounting standards that closely correlate with international financial reporting standards. In September 2006 and February 2007, the FASB issued two key fair value accounting (FVA) standards which focused on providing guidelines for fair value measurement (through a classification hierarchy), expanding disclosure requirements, and also allowing business entities to increase the application of FVA. In 2006 IASB issued IFRS 7, *Financial Instruments: Disclosures* asking firms to provide market risk disclosure. The standard came into effect in January 2007. The last modifications to the standard were applied in July 2008. It addresses the demand for risk information that allows investors and other classes of stakeholders to assess a firm's future economic performance adopting FVA. However, the recent financial crisis has placed increased scrutiny on estimates derived under FVA. Fair value measurement, not limited to financial instruments, is provided by IFRS 13, issued on 12 May 2011. However, the principle has not been endorsed by the EU, even if Efrag provided endorsement advice in January 2012.

Two competing views underly the debate: a *Fair Value View*, implicit in the IASB's public

pronouncements, and an *Alternative View* implicit in publicly expressed criticisms of the IASB's pronouncements. Whittington (2008) concluded that, in a realistic market setting, the search for a universal measurement method may be fruitless and a more appropriate approach to the measurement problem might be to define a clear measurement objective and to select the measurement method that best meets that objective in the particular circumstances that exist in relation to each item in the accounts.

Before the 2008 financial crisis, Fair Value seemed the best solution to obtain transparent and significant information from financial statements, both from the users' and from the prepares' perspective. The financial crisis period may raise an issue of revival of conservative concepts in financial reporting, e.g. historical cost measurement and application of the prudence principle.

Considering financial instrument evaluation, for many years there has been an open discussion between those who consider that the mixed model[1] should definitely evolve into a full fair value model in which all financial instruments are measured at fair value with changes recognized in the profit and loss account and those who consider that the mixed model is the optimal model for financial instrument accounting.

It seems that the full fair value model has clear advantages that are easy to demonstrate, but it is also true that there are sufficient disadvantages to preclude its implementation, at least for the moment. To limit the disadvantages and the difficulties to obtain "correct" estimates of fair values evaluated with models, the Boards decided to establish a three-level hierarchy that distinguishes (1) readily observable measurement inputs from (2) less readily observable measurement inputs and (3) unobservable measurement inputs.

No uniform framework is available to assure consistent fair market valuation and transparency for investor decision-making. Conceptual solutions of valuation issues need not to emerge from current economic situation and it is impossible to change this concept every time when economic conditions tend to change. Unsystematic changes of valuation concepts may produce instability of the economic system.

2. Literature review

Fair Value Hierarchy, introduced by FAS No. 157 and transposed by IASB in IFRS 7, prioritizes the source of information used in fair value measurements into three levels: (1) Level 1 (observable inputs from quoted prices in active markets), (2) Level 2 (indirectly observable inputs from quoted prices of comparable items in active markets, identical items in inactive markets, or other market-related information), and (3) Level 3 (unobservable, firm-generated inputs). Considering the value relevance of fair value accounting, Song et al. (2008), using quarterly reports of banking firms in 2008, found that the value relevance of Level 1 and Level 2 fair values is greater than the value relevance of Level 3 fair values. This evidence produced a growing literature focused on the effect that the adoption of fair value measurements, with particular regard to financial instruments measurement considering the financial crisis of the last few years, on reported earnings and on dividend policy adopted by listed companies and banks.

Starting from the question if fair value can help earnings manipulation, the study of Benston (2008) answers with a positive response, underlining that the implementation of SFAS 157 - which specifies the *fair value* as an *exit value* - is likely to be costly for investors and independent public accountants.

Using an international sample of 222 banks from 41 countries, Fiechter (2011) examines whether the use of the fair value option affects earnings volatility. Prior empirical studies associate higher levels of earnings volatility with fair value accounting (Barth et al. 1995; Hodder et al. 2006). In contrast, the author found evidence that banks applying the fair value measurement to reduce accounting mismatches exhibit lower earnings volatility than other banks. He concludes that banks can use flexibility in accounting to reduce artificial earnings volatility.

The same results have been achieved by Dechow and Shakespeare (2009) who documented that firms time securitization transactions to suit their financial reporting purpose. Moreover, Dechow et al. (2010) found evidence that securitization gains are significantly negatively related to pre-securitization gains. Together, those studies indicate that securitizations are employed as an earnings management tool, either through 'real' earnings management (timing of the gains recognition) or through discretion over accounting assumptions. Therefore, thiese results indicate that managers use the flexibility available in fair value accounting rules to smooth earnings.

Answering Dechow et al. (2010) and in defense of fair value, Barth and Taylor (2010) clarify the role of fair value in accounting for asset securitizations, discussing alternative explanations for the evidence presented in DMS, and offering suggestions for future research, advising against inferring the desirability of any particular accounting method from earnings management research. 'Real' earnings management, following Barth and Taylor (2010), refers to situations where firms enter into transactions that alter current period earnings, but do *not* manipulate the accounting estimates. The discretion over the timing of securitizations puts securitization transactions in this category. Real earnings management smoothes out accounting earnings, but it does *not* really undermine

[1] A mixed model is an accounting model that considers a mix of fair value and hystorical cost – depending from assets and liabilities - but also a model in which some modifications of fair value are in OCI instead of in Profit and Loss.

the integrity of securitization accounting (Dechow and Shakespeare, 2009).

Building on Henry's (2009) study of early adopting banks, the paper of Guthrie et al. (2011) examines to what extent firms' election of instruments benefited their current or future earnings. Under the fair value option, SFAS 159, firms have full discretion over electing to report specified financial instruments at fair value on a contract-by-contract basis. The sample adopted comprises the constituents of the S&P 1500 Index for the first quarters of fiscal years 2007 and 2008. Expanding the sample across industries and over time allows the authors to obtain a more complete picture of the adoption of the fair value option. The authors do not find evidence of systematic opportunistic election of the fair value option. In only a handful of cases, concentrated among early adopters with an earnings shortfall, did firms experience a significant improvement in current or future earnings that casts doubt on whether their adoption was keeping with the intent and spirit of the standard.

Focusing on topics related to earnings management, Goncharov et al. (2011) examine the impact of positive fair value adjustments on dividend policy. Authors state that, if fair value adjustments are transitory in nature and managers are able to assess their implications for future earnings, fair value adjustments in net income are expected to have no distribution consequences. However, positive fair value adjustments may lead to higher dividends when management incorrectly assesses their persistence, thus having a potential for pro-cyclical impact because higher dividends increase leverage, and thus risk. Finally, they found no empirical support for the concern that dividends increase in response to positive fair value adjustments.

Considering advantages and disadvantages of FVO, Magnan (2009) discusses how FVA affects the nature of financial reporting, especially for financial institutions that were deeply affected by the 2007-9 financial crisis. The evidence of the investigation suggests that FVA, in combination with its use by regulators, may have severely undermined the financial condition of some institutions. In particular, the effect was amplified for institutions holding assets in markets that saw their liquidity dry up during the crisis. In other words, FVA may have amplified the crisis.

On this topic, Kothari et al. (2010) review the positive theory of GAAP that predicts that GAAP's principal focus is on control (performance measurement and stewardship) and that verifiability and conservatism are critical features of a GAAP shaped by market forces. The authors recognize the advantage of using fair values in circumstances where these are based on observable prices in liquid secondary markets, but caution against expanding fair values to financial reporting more generally. They conclude that rather than converging the American GAAP with IFRS, competition between the FASB and the IASB would allow GAAP to better respond to market forces

Considering the impact of fair value accounting on financial statement analysis, Rodríguez-Pérez et al. (2011) tried to shed some light on this issue by restating the financial investments and tangible fixed assets of a sample of 85 Spanish insurance companies, applying fair value instead of historical-cost-based valuations and by simulating analyst perception of these companies' efficiency and profitability for both sets of data using data envelopment analysis (DEA), a method used to empirically measure productive efficiency of decision making units. They found that the numbers “on the face” of the financial statements change considerably and observe that the magnitude of these changes varies between companies and classes of assets. However, only in a few cases does a change in the valuation basis lead to a relevant change in DEA scores; within the sample, the overall assessment of companies with regard to efficiency and profitability remains largely the same under both valuation bases. Findings of Rodríguez-Pérez et al. (2009) seem to indicate that a change from historical cost to fair value accounting could alter analyst perceptions of a limited number of companies but probably will not have a major impact on the appraisal of the majority of them.

Given the previous debate, the aim of the paper is to verify if the principles adopted by the Boards referring to Fair Value Hierarchy are effective in practice and if these principles permit to obtain a clear disclosure of the value and the risks associated with the financial instruments owned by the bank sector. Moreover, the analysis of data is completed with the construction of some regressive equations with the aim to test the relations between some variables described in financial statements and the volume, the evaluation models and the information referring to the different level of fair value existing for financial instruments – that will be better described in the following paragraph. From the qualitative and the quantitative analysis it is also possible to obtain a first indication of the utility of this data for investors.

3. Reasons for the empirical analysis

The validity of the theory on different relations existing between accounting information released in the Annual Reports of a sample of listed banks, market capitalization at year end and the three levels of fair value adopted to assess the value of assets and liabilities (*Fair Value Hierarchy*) has been tested. For the purpose of the study we used statistical tools including multivariate regression analysis. In particular, the aims of the analysis are:

i. To verify if a significant relation can be found between specific accounting information reported on the Annual Report of a company in the sample and a set of specific variables related

to each company. In particular, we focused on the explanatory power of three levels of fair value adopted to assess assets and liabilities - related to fair value hierarchy to explain market related dynamics (i.e., market capitalization) and accounting variables (i.e., net income) over time;

ii. to verify if a relation exists between the annual percentage performance of portfolios of assets (or the net performance considering also liabilities) evaluated at fair value of level one and the annual percentage performance of portfolios of assets (or the net performance considering also liabilities) evaluated at fair value of level two and three;

iii. to verify whether the relationships detected in (i) and (ii) are statistically significant and have good explanatory power;

iv. To interpret the quantitative results in order to draw conclusions about the impact of each fair value measure on the selected dependent variables in a corporate governance perspective analysis.

Furthermore, the study provides detailed analysis for detecting eventual homogeneities in *sub*-groups of companies characterized by common characteristics in terms of geographic area and quantitative relevance of the third level-fair value measure of assets.

4. Methodology and data design

4.1 Data source of the analysis

Since the raw data used to calculate each explanatory variable (EV) – such as FV x A and FV x L, for each level of fair value one, two and three - and part of the dependent variable (DV) as Net Income (NI) are calculated on the basis of the information reported on the companies' Annual Reports, for each year of study the model estimates refer to the closing date of the Annual Report at December 31st.

The models shown in Table 2.2 are tested for the years 2009, 2010 and 2011 considering the introduction of Fair Value Hierarchy as stated in accounting principles. As some variables are expressed in terms of annual variation, data has been collected also for 2008. The data has been taken from retrieved from the Bloomberg economic-financial database.

The raw data used to determine the value of the variables described in Table 1 refers to a sample of companies (the "Sample") selected using the following criteria:

i) companies that are not listed on any equity stock market have been excluded from the sample. This criterion is necessary as we need to calculate the annual stock market price variation of firms;

ii) for each listed firm only the primary equity security is taken into account in order to avoid considering the same company more than once;

iii) the selection is limited to the companies which operated in the banking sector (Bloomberg ICB sector "Banks") in the three-year period considered;

iv) we include in the selection only the companies for which, in their last official document available on Bloomberg, at the reference date of the research, the information was specified regarding asset fair value measures of each level (one, two and three).

v) the sample was increased to include some specific Italian banks that were not found by Bloomberg through the research criteria (function <EQS>) specified in the previous points from i) to iv).

Finally, the availability of data, *de facto*, has operated as an additional criterion which excluded from the Sample the companies whose raw data, at the research date, were not available, entirely or in part, on the database used to collect information.

The Sample according to these criteria is reported in Table A.5; however, the amplitude and the composition of the sample used for the analysis vary for each regression depending on the availability of the specific data which are necessary to calculate the DV and the EV of the model.

Furthermore, different subsets of the Sample have been identified to test the validity of the model also for sub-groups of banks characterized by homogeneities in terms of:

a. Geographical area of the country of Headquarters

The Sample is subdivided into three groups: World (all the Sample), Italy and United States. This subdivision is necessary because, even if IASB and FASB have recently tried to converge on fair value accounting principles, some differences still exists. Moreover, some countries apply local GAAP instead of IFRS and SFAS. This subdivision permits us to verify if there are differences in fair value hierarchy disclosure joined to the nationality of the banks;

b. Quantitative relevance of the third level-fair value measure of assets (FV 3 A)

For each model, year (t) and observed company (i) we defined the following indicator ("FV 3 %R" in equation 3.1), which expresses the quantitative relevance of the third level-fair value measure of assets on the total sum of fair value measures of assets referred to company (i) at time (t):

$$FV\ 3\ \%R_t^i = \frac{FV\ 3\ A_t^i}{FV\ 1\ A_t^i + FV\ 2\ A_t^i + FV\ 3\ A_t^i} \qquad (3.1)$$

Afterwards, for each *sub*-sample examined, we calculated 33,33% (P_{33}) and 66,67% (P_{66}) of FV 3%R empirical distribution, defining three possible ranges of the indicator:

- first percentile range: $FV\ 3\ \%R_t^i \leq P_{33}$;
- second percentile range: $P_{33} < FV\ 3\ \%R_t^i \leq P_{66}$;
- third percentile range: $FV\ 3\ \%R_t^i > P_{66}$.

Finally, the *sub*-sample's raw data and variables were divided into three groups:

i) PERC. FV 3 n°1: the companies whose FV 3%R indicator value fell in the first percentile range;
ii) PERC. FV 3 n°2: the companies whose FV 3%R indicator value fell in the second percentile range;
iii) PERC. FV 3 n°3: the companies whose FV 3%R indicator value fell in the third percentile range.

Before testing hypotheses and running regressions, a qualitative analysis of available data was performed in order to verify if data provided in financial statements (i) is compliant with current accounting principles (ii) is clear, understandable and useful for stakeholders/investors. This step of the analysis provided us with useful information for the purpose of this study but, due to the large volume of data, results are not shown. Nevertheless, this step helped us to select only the set of companies formally compliant with accounting principles.

4.2 Set of variables

The set of dependent variables selected – *Net Income* and *Market Capitalization* – are highly significant for investors and external stakeholders. These two variables, even if they can suffer from the potential effect of other factors (i.e., accounting policy for Net Income; short term market conditions for Market Capitalization) they can be considered good proxies to set up the economics of a company. Regarding the independent variables, different levels of fair value and annual changes in value are considered. These represent key elements for the purpose of our study.

From a technical point of view, the variety of possible explanatory variables ("EV") that can be defined with reference to each level of fair value and, similarly, the multiplicity of dependent variables ("DV") that could be linked to those fair value measures, has determined the need to test more than one statistical model. In particular, Table 1 shows the set of DV and EV.

Table 1. Dependent variables and explanatory variables

DV - Dependent variables		
Symbol	**Description**	**Calculation formula**
MC	Market capitalisation	Raw data
NI	Net income	Raw data
EV - Explanatory variables		
Symbol	**Description**	**Calculation formula**
FV x A	Fair value measure of level (x) of assets	Raw data
FV x L	Fair value measure of level (x) of liabilities	Raw data
Δ FV x A	Absolute variation between year [t-1] and year [t] of FV x A	(FV x A [t]) - (FV x A [t-1])
Δ FV x L	Absolute variation between year [t-1] and year [t] of FV x P	(FV x L [t]) - (FV x L [t-1])
FV x net	Net fair value measure of level (x)	(FV x A) - (FV x L)
Δ FV x net	Absolute variation between year [t-1] and year [t] of FV x net	(Δ FV x A) - (Δ FV x L)
Δ% FV x A	Percentage change between year [t-1] and year [t] of FV x A	Δ FV x A / (FV x A [t-1])
Δ% FV x net	Percentage change between year [t-1] and year [t] of FV x net	Δ FV x net / (FV x net [t-1])

Note (1): stock variables refer to 31st December of year [t].

Note (2): variations (Δ and Δ%) refer to the value change occurring between 31st December of year [t-1] and 31st December of year [t].

4.3 The relationship investigated: models

The following Table 2 shows the structure – in terms of DV and EV - of the statistical models examined in this paper.

Table 2. The structure of the examined statistical models in terms of DV and EV

Model n° #	Dependent variable DV	Independent variables EV.1	EV.2	EV.3
1	MC	FV 1 A	FV 2 A	FV 3 A
2	NI	Δ FV 1 A	Δ FV 2 A	Δ FV 3 A
3	Δ% FV 1 A	-	Δ% FV 2 A	Δ% FV 3 A
4	Δ% FV 1 net	-	Δ% FV 2 net	Δ% FV 3 net

In order to refine the analysis, tests for four different models have been provided. For each model tested, the coefficients have been estimated adopting the Ordinary Least Squares ("OLS") method through a multivariate linear regression.

In formula is (the "Model" of equation 2.1):

$$\boldsymbol{DV_t^i = \beta_0 + \beta_1 EV.1_t^i + \beta_2 EV.2_t^i + \beta_3 EV.3_t^i + \varepsilon_t^i} \quad (2.1)$$

The hypotheses underlying the Model are the standard assumptions of the OLS. As specified in paragraph 4, some of them have been tested in order to verify if this method is applicable to the data set for the purpose of the analyses.

Since the models are cross-sectional, the value of DV_t^i is estimated for a reference date (t) as a function of the value that the independent variables assume at the same time (t). Parameters have been estimated for a fixed value of (t) on the basis of observation of the variables related to the (n) elements of the selected sample of companies described in paragraph 1.

The main objective of the analyses is to establish whether a stable and direct relationship can be assessed between different level and annual changes of fair value, as stated in accounting principles, and two main variables related to companies, net income as reported in annual statements and market capitalization at year end.

4.4 The tests

The models of Table 2 are tested separately varying the reference time (t) and the *sub*-sample of companies considered using the OLS regressions as described above.

For a given model of Table 2.2 - considering the *sub*-divisions specified in point a. (three geographical areas) and in point b. (three ranges of FV 3 A) of paragraph 3 and that we repeated these analyses for each of the selected years (2009, 2010 and 2011) - we have developed a total of eighteen regressions per model. Consequently, to examine all the models of Table 2.2 we have run 72 OLS regressions.

For each regression, in addition to the analysis of coefficients values, we checked the statistical significance of the model through the following tests:

- F statistic

To verify the statistical significance of the whole model;

- Student's t

To verify the statistical significance of the single explanatory variables;

- Adjusted R-squared

To measure the ability of the model to explain the variance of sample observations.

For each model of Table 2.2, the study of each combination [year (t); *sub*-sample of companies] is structured in two phases:

i) The parameters of the Model are estimated including all the EV specified in Table 2.2. Therefore, we can verify the singular statistical significance of each independent variable through its Student's t P-Value;

ii) On the base of the results of phase i), a second-step OLS regression is repeated for the same combination [year (t); *sub*-sample of observations] excluding the independent variables whose Student's t in the first regression resulted statistically not significant at a level of confidence of 95% (P value ≤ 5%). Considering all the scenarios, the final number of regressions run in the first and in the second phase is equal to 144 – that is;

$$144 = \{[(3_{\text{geogr. areas}} + 3_{\text{FV 3 percentiles}})\, 3_{\text{years}}]\, 4_{\text{models}}\}\, 2_{\text{analysis phases}}$$

Since the null hypothesis (coefficient of the single explanatory variable equal to zero) cannot be rejected at a level of confidence of 95% for Student's t P-values higher than 0,05, for the purposes of this paper we consider only the results of the second-step analyses described in ii).

5. Empirical evidence on testing hypothesis: results and discussions

All the models shown in Table 2.2 have been tested through both the first-step and the second-step groups of regressions described in the previous paragraph.

Considering that each model has been tested through eighteen different regressions and that the plurality of statistical indicators used to verify the

validity of each of them, the general judgment of statistical significance has been characterized by inevitable elements of subjectivity. Furthermore, for some models (3 and 4), the results of the analyses show low statistical significance but in any case are relevant to draw conclusions in a corporate governance study.

In general, with reference to Models 1 and 2, the outputs of the regressions (shown in Appendix, Table A.1 and Table A.2) highlight that, on average, the F statistic assumes very high values for most of the dates (t) and the *sub*-samples analyzed, showing that, in most cases, coefficients are jointly significant independently from the reference year and from the specific companies considered in the regression.

Similarly, also the adjusted R-squared, on average, is very high for all the 36 regressions relating to Models 1 and 2. In particular, it is interesting to notice that the average value is 76.23%, while the median value is 86.43%.

As expected, the proportion of variability in the sample observations that is accounted for by the explanatory variables (measured by the adjusted R-squared) increases when we consider a more restricted geographical area. For each year the statistic is higher for the USA and Italy, while it is significantly lower – despite still being high in absolute terms – for the whole Sample. This can be attributed to the fact that for groups of companies characterized by the same country of domicile the values of coefficients can be better estimated in order to reflect nation-specific social, economic, financial, and cultural factors, thus allowing a more accurate estimate of a bank's book value.

On the contrary, it is interesting to note that, for each of the three years, on average, the maximum values of Adjusted R-squared are observable in the first percentile range, following in decreasing order the second and the third percentile range.

A common characteristic observed among significant models is the instability of the independent variables structure.

The following analyses examine each model in order to detect eventual regularities in the EV structure and to draw conclusions about the characteristics concerning the corporate governance of companies across the different *sub*-samples examined.

Hypothesis 1: *Is there any statistical and significant correlation between* market capitalization at year end *and financial assets evaluated at different levels of fair value?*

$$\boldsymbol{MC_t^i = \beta_0 + \beta_1 (FV\ 1\ A)_t^i + \beta_2 (FV\ 2\ A)_t^i + \beta_3 (FV\ 3\ A)_t^i + \varepsilon_t^i}$$

The results of the regression for Model 1 are presented in the Appendix in Table A.1.

Similar to Model 1, on average, USA presents the highest level of significance in terms of both F statistic and single Student's t of coefficients. Moreover, it is characterized by the highest values of adjusted R-squared.

Both for Italy and the USA the third level measure of fair value of assets (FV 3 A) is significant to estimate the market capitalization of banks for all the years examined.

With reference to the *sub*-samples distinguished according to the percentile range of FV 3% R, we notice that, on average, FV 3 A is the explanatory variable which proves statistically significant in most of the cases, followed by FV 2 A and FV 1 A.

Model 1 shows that market capitalization of banks in the sample seems to have a high level of correlation with asset evaluated at fair value level three, although these results cannot be generalized looking at different levels of significance considering three subsamples (World, USA, Italy). It is interesting to note that in USA market different levels of fair value in the valuation of assets seems to be always significant. Otherwise, in the Italian market, significance of fair value assets at different level is higher over time (low in 2009, high in 2011). This evidence can allow us to say that the Italian market is going to improve the adoption of fair value to better assess value of asset portfolio.

Focusing on the Italian market, results show that FV asset level three is always significant, these indicating that banks can use the fair value at level three to mitigate negative effects of undervaluation due to particular market conditions, as in the period 2009-201 after the financial crisis.

Hypothesis 2: *Is there any statistical and significant correlation between* net income at year end *and annual change in assets evaluated at different levels of fair value?*

$$\boldsymbol{NI_t^i = \beta_0 + \beta_1 (\Delta\ FV\ 1\ A)_t^i + \beta_2 (\Delta\ FV\ 2\ A)_t^i + \beta_3 (\Delta\ FV\ 3\ A)_t^i + \varepsilon_t^i}$$

The results of the regression for Model 2 are presented in the Appendix in Table A.2.

We estimated NI as a function of the annual variation of the different level of fair value measures of assets. The results show that the USA is characterized again by the highest values of F statistic and adjusted R-squared, but the independent variables structure is unstable over the years.

In the percentile ranges differentiation of *sub*-samples, the EV structure is highly unstable and in 33.3% of cases the coefficients are not significant, hence we reject the hypothesis of significant differences between the groups of banks characterized by different levels of FV 3 impact on the total of fair value measures of assets.

In general, the regressions output of Model 2 shows interesting homogeneity across the different *sub*-samples analyzed: in most of the cases the coefficient of Δ FV 3 A is negative, while the coefficient of Δ FV 1 A is positive. The second level-measure, Δ FV 2 A, is placed at an intermediate point.

This result can allow us to affirm that the fair value option, in particular considering FV level 3, can be considered as, among others influencing net income value, one of the tools to mitigate effects of the countercyclical trend in bad years such as the ones observed. Nevertheless, this proposition has to be tested in more detail, considering other factors influencing net income dynamics.

For this purpose, with reference to the same companies considered in the regressions of the World *sub*-sample in Model 2, it is interesting to analyze the empirical percentages of times in which, for each combination of year (t) and level (x) of fair value, the value of the variable Δ FV x A has the same sign as the Net Income (shown in Table 3).

Table 3. Empirical percentages of times in which, for each combination of year (t) and level (x) of fair value, the value of the variable Δ FV x A has the same sign of NI

Year	Δ FV 1 A	Δ FV 2 A	Δ FV 3 A
2009	60.42%	54.17%	45.83%
2010	57.14%	61.90%	33.33%
2011	47.89%	61.97%	46.48%

It is evident to notice that Δ FV 1 A and Δ FV 2 A are characterized by the highest percentages, while those referring to Δ FV 3 A are significantly lower. Furthermore, the lowest percentages of Δ FV 3 A (in absolute) and the widest differentials between the third level and the first two are observable for 2009 and 2010, namely the years that immediately followed the financial crisis which began in 2008. This can be related to the hypothesis that FV3 can be used as a countercyclical tool for earnings management.

Similar results are obtained repeating the same analyses with reference to the net measure of fair value (Table 4).

Table 4. Empirical percentages of times in which, for each combination of year (t) and level (x) of fair value, the value of the variable Δ FV x net has the same sign of NI

Year	ΔFV 1 net	ΔFV 2 net	ΔFV 3 net
2009	62,96%	51,85%	37,04%
2010	55,26%	55,26%	39,47%
2011	48,89%	57,78%	48,89%

Before any definitive conclusion, the study should be further investigated in order to remove the assumptions described above and to consider also the effect of the other variables that influence NI. However, the results of our analyses constitute evidence that, with reference to our Sample of banks, in the years from 2009 to 2011 the variables calculated as a function of the third level-measure of fair value behaved in a way that was significantly different, in statistical terms, in comparison to the ones calculated as a function of the first and the second-level measures of fair value.

We proceed in the analysis of Model 3 (4), in which the annual percentage change of FV x A (FV x net) is expressed as a function of the annual percentage change of the same variable referring to the second and the third level measure of fair value. Hence, in comparison to the models previously analyzed, the number of repressors is reduced to two.

The aim of these models is to verify if the second and the third level-measures of fair value vary in accordance with the first, or if they vary in a significantly different way, or if there is not any significant linear relationship. In this sense, we conjecture that, as FV 1 A (FV 1 net) are a *proxy* of the market indexes that must be taken as a reference for evaluating assets and liabilities of the second and third level of fair value - independently from the specific models used by banks for their assessment -, Δ% FV 2 A (Δ% FV 2 net) and Δ% FV 3 A (Δ% FV 3 net) should vary in accordance to Δ% FV 1 A (Δ% FV 1 net).

In addition to the assumptions specified above, models 3 and 4 require a further hypothesis: for each level of fair value, the portfolios of assets and liabilities assessed at fair value are characterized by the same internal distribution of financial instruments in terms of typology and economic value. Since we focus on the annual percentage changes, no hypothesis is made on the absolute total value of each portfolio, but only on their internal qualitative composition and the percentage weight of the

categories of elements that constitute them. As for the previous assumptions, also this hypothesis could be removed in further studies examining the internal composition of each level of fair value-measure.

Hypothesis 3: *Is there any statistical and significant correlation between* annual change in fair value asset of first level *and annual change in fair value asset at levels two and three?*

$$(\Delta\% \boldsymbol{FV\ 1\ A})_t^i = \boldsymbol{\beta_0} + \boldsymbol{\beta_2}(\Delta\% \boldsymbol{FV\ 2\ A})_t^i + \boldsymbol{\beta_3}(\Delta\% \boldsymbol{FV\ 3\ A})_t^i + \boldsymbol{\varepsilon_t^i}$$

The results of the regression for Model 3 are presented in the Appendix in Table A.3.

It is evident that the model is not significant in most of cases, as in 10 regressions out of 18 we cannot refuse the hypothesis that coefficients are jointly equal to zero. With reference to the cases of joint significance of coefficients, we do not detect any stability in the EV structure over the years and the *sub*-groups of companies examined.

Consequently, we can infer that no relevant linear relationships exist between the percentage performance of FV 1 A and the percentage performance of FV 2 A and FV 3 A.

Hypothesis 4: *Is there any statistical and significant correlation between* annual change in net fair value of level 1 *and annual change in net fair value at levels two and three?*

$$(\Delta\% \boldsymbol{FV\ 1\ net})_t^i = \boldsymbol{\beta_0} + \boldsymbol{\beta_2}(\Delta\% \boldsymbol{FV\ 2\ net})_t^i + \boldsymbol{\beta_3}(\Delta\% \boldsymbol{FV\ 3\ net})_t^i + \boldsymbol{\varepsilon_t^i}$$

The results of the regression for Model 4 are presented in the Appendix in Table A.4. Unlike Model 3, for each level of fair value we express DV and the EV in terms of net fair values.

The analysis of Model 4 has confirmed also for the net measures of fair value the results obtained with reference to Model 3 about the non-correlation between the annual percentage performance of the financial instruments assessed at fair value of level one and the percentage performance of those assessed at fair value of the second and third levels.

6. Conclusion and further research

The paper investigates if any relation between fair value hierarchy and variables related to market capitalization and net income can be assessed, assuming that data used in the analysis is formally compliant with International Accounting Standard IAS/IFRS and US GAAP. Moreover, a second level of analysis tries to evaluate if any relation between changes in value of FV1 asset and FV1 net (defined as accounting value of asset minus accounting value of liabilities) can be found.

In the first part of the analysis, we found that market capitalization and net income are correlated with value of asset evaluated at different level of fair value. This evidence is particularly strong for the US market subsample. This allows us to say that, even if the US GAAP and IFRS 13 can be considered quite close in evaluation of financial assets through fair value option, the evidence has to be further investigated.

Looking at relation between net income and changes in value of assets evaluated at different levels of fair value, results show that level three of fair value can be considered as a countercyclical tool available to be used in contrast in bad periods, such as 2009-2011 characterized by financial crisis.

Considering models adopted, results from our analysis can be summarized as follows:

- Fair value level 3, which is the more subjective criterion in financial instrument measurement, shows poor relevance in US banks and much less relevance in Italy;
- Disclosure on fair value hierarchy is not widely adopted: considering a potential sample of more than 2,500 listed banks, only 281 currently disclose on three different levels of fair value, as requested by accounting principles (IFRS 7 and SFAS 157);
- Even if financial instruments assessed adopting fair value level 3 are quite dissimilar considering level 1 and 2 of fair value, a broaden disclosure seems to be required for this class;
- Since data on fair value level 3 shows results not always consistent, it seems to be necessary to better investigate in order to assess if "anomalies" can be referred to specific classes of financial assets, market trends, models and assumptions adopted for evaluation;
- Even if the fair value level 3 is more subjective, the degree of subjectivity in evaluation of financial instruments of level 2 - more significant in value considering the whole portfolio - has to be taken into account.

Results of regression analysis show that variables investigated – market capitalization, net income and three levels of fair value – are quite associated, under specific assumptions, but they do not offer unique and clear information to investors in terms of usefulness for their capital allocation strategy.

In synthesis, even if fair value hierarchy principles allow a better understanding about trends in value and composition of banks financial instrument portfolios, they suffer from two main limitations: (i) subjectivity problems in value estimation; (ii) short term volatility in results due to changes in macroeconomic variables.

7. Limitations of the analysis

The analysis is based on the assumption that, for each year and company studied, the portion of assets and liabilities assessed at fair value that have been reclassified at a different fair value level from one year to the next is equal to zero. This coincides with the assumption that the annual change of level (x)-fair value measure is entirely attributable to the variation of value of the assets and the liabilities assessed at that level (x) and not to a change in the valuation criteria (to a different fair value level) of financial instruments assessed at fair value. Furthermore, we assume that, for each level of fair value, companies did not increase or decrease from one year to the next the amount of resources invested (for assets) and borrowed (for liabilities) that are assessed at fair value. Thus we assume that companies may have changed portfolio compositions, but did not disinvest or invest new resources in fair value-assessed financial instruments from one year to the next.

Both hypotheses could be removed in further works investigating, for each level of fair value, the portfolio composition of assets and liabilities assessed at fair value.

In synthesis, hypotheses at the base of the models investigated have to be assessed to better fit the complexity of the economics involved. In fact, even if results show a good degree of correlation between market capitalization and net income, the study has to be improved to take into account some main aspects

(i) composition of each portfolio of asset and liabilities,
(ii) *change* in composition and portfolio
(iii) Specific weight of each class of asset and liability considering the whole value of asset portfolio and financial structure of bank sample.

These limitations are relevant in particular for models 3 and 4 to fix any conclusions that can allow us to affirm that a good degree of correlation can be found and that banks use fair value option to mitigate the effect of bad years in terms of portfolio performance and, hence, in terms of earnings management.

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Appendix

Table A.1. Parameters estimation and tests of significance for Model 1

Model 1 - regr. (ii)	2009			2010			2011		
Sub-sample	**WORLD**	**ITALY**	**USA**	**WORLD**	**ITALY**	**USA**	**WORLD**	**ITALY**	**USA**
Number of observations	186	13	146	211	14	166	240	15	191
F statistic	256.874	1,483.471	689.601	356.073	982.108	2,381.461	912.064	234.009	2,104.116
P-Value F statistic	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Adjusted R-squared	72.94%	90.86%	93.44%	77.18%	91.01%	97.74%	88.40%	89.71%	95.68%
Significant EV									
Intercept	-	-	973,953.6	-41,727,992.5	-	1,088,451.7	-23,781,943.4	-	1,020,241.0
P-Value Intercept	-	-	0.045	0.026	-	0.000	0.022	-	0.000
FV1 A	0.260	-	-0.272	4.962	0.198	-0.463	4.123	0.245	-0.659
P-Value FV1 A	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FV2 A	-	-	-0.047	-0.541	-	-0.048	-0.454	-0.132	-
P-Value FV2 A	-	-	0.000	0.000	-	0.000	0.000	0.001	-
FV3 A	0,573	0,542	2,485	-	1,269	3,807	-	1,442	2,900
P-Value FV3 A	0.000	0.000	0.000	-	0.000	0.000	-	0.001	0.000

Sub-sample	PERC. FV 3 n°1	PERC. FV 3 n°2	PERC. FV 3 n°3	PERC. FV 3 n°1	PERC. FV 3 n°2	PERC. FV 3 n°3	PERC. FV 3 n°1	PERC. FV 3 n°2	PERC. FV 3 n°3
Number of observations	61	64	61	68	72	71	81	80	79
F statistic	1,032.997	197.169	284.926	5,963.351	175.929	318.604	376.345	1,238.714	273.744
P-Value F statistic	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Adjusted R-squared	98.10%	84.58%	80.94%	98.89%	86.65%	80.56%	92.09%	95.63%	86.21%
Significant EV									
Intercept	963,239.1	-	-	-891,195.1	-	-	-	-	-
P-Value Intercept	0.019	-	-	0.000	-	-	-	-	-
FV1 A	1.117	0.586	-	-	1.812	4.460	-2.739	-	-
P-Value FV1 A	0.000	0.000	-	-	0.000	0.000	0.000	-	-
FV2 A	-0,154	-	-	1,357	0,509	-	0,832	-3,435	-0,089
P-Value FV2 A	0.000	-	-	0.000	0.002	-	0.000	0.000	0.000
FV3 A	-117,759	-4,448	1,163	-	-50,329	-	204,070	149,114	2,968
P-Value FV3 A	0.000	0.000	0.000	-	0.000	-	0.000	0.000	0.000

Table A.2. Parameters estimation and tests of significance for Model 2

Model 2 - regr. (ii)	2009			2010			2011		
Sub-sample	**WORLD**	**ITALY**	**USA**	**WORLD**	**ITALY**	**USA**	**WORLD**	**ITALY**	**USA**
Number of observations	48	9	25	63	9	27	71	14	28
F statistic	41.859	112.136	2,150.321	31.261	60.318	3,106.881	35.720	103.521	2,811.524
P-Value F statistic	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Adjusted R-squared	46.51%	82.26%	95.10%	49.40%	75.79%	95.58%	58.57%	81.15%	99.52%
Significant EV									
Intercept	4,712,934.4	-	-	4,674,159.2	-	-	-	-	466,620.3
P-Value Intercept	0.024	-	-	0.005	-	-	-	-	0.028
Δ FV1 A	-	0.470	0.255	-	0.454	1.907	1.011	-	-
P-Value ΔFV1A	-	0.000	0.002	-	0.000	0.000	0.000	-	-
Δ FV 2 A	-0.054	-1.192	-0.191	-0.197	-	-	0.156	-	0.197
P-Value ΔFV2A	0.000	0.000	0.000	0.000	-	-	0.004	-	0.000
Δ FV 3 A	-	-	-	-2.797	-	-3.698	-2.139	12.620	-0.508
P-Value ΔFV3A	-	-	-	0.000	-	0.000	0.016	0.000	0.001

Sub-sample	PERC. FV 3 n°1	PERC. FV 3 n°2	PERC. FV 3 n°3	PERC. FV 3 n°1	PERC. FV 3 n°2	PERC. FV 3 n°3	PERC. FV 3 n°1	PERC. FV 3 n°2	PERC. FV 3 n°3
Number of observations	10	NOT SIGNIF.	NOT SIGNIF.	10	22	31	NOT SIGNIF.	22	33
F statistic	89,258.102	-	-	5,641.276	29.142	32.895	-	148.881	42.296
P-Value F statistic	0.000	-	-	0.000	0.000	0.000	-	0.000	0.000
Adjusted R-squared	87.49%	-	-	88.73%	72.83%	51.53%	-	90.23%	69.09%
Significant EV									
Intercept	-	-	-	-	4,394,140.6	4,860,917.6	-	-	-
P-Value Intercept	-	-	-	-	0.033	0.073	-	-	-
Δ FV 1 A	-0.703	-	-	0.804	-	-	-	0.836	-0.257
P-Value ΔFV1A	0.000	-	-	0.000	-	-	-	0.000	0.009
Δ FV 2 A	-	-	-	-	-0.706	-	-	0.480	0.140
P-Value ΔFV2A	-	-	-	-	0.000	-	-	0.000	0.000
Δ FV 3 A	-4.532	-	-	-	7.502	-2.462	-	-14.523	-
P-Value ΔFV3A	0.000	-	-	-	0.003	0.000	-	0.000	-

Table A.3. Parameters estimation and tests of significance for Model 3

Model 3 - regr. (ii)	2009			2010			2011		
Sub-sample	WORLD	ITALY	USA	WORLD	ITALY	USA	WORLD	ITALY	USA
Number of observations	48	9	25	NOT SIGNIF.	NOT SIGNIF.	NOT SIGNIF.	65	14	NOT SIGNIF.
F statistic	106.358	8.161	55.111	-	-	-	319.776	107.223	-
P-Value F statistic	0.000	0.024	0.000	-	-	-	0.000	0.000	-
Adjusted R-squared	67.23%	47.23%	65.50%	-	-	-	81.76%	81.49%	-
Significant EV									
Intercept	-	0.4	-	-	-	-	-	-	-
P-Value Intercept	-	0.014	-	-	-	-	-	-	-
Δ% FV 2 A	-	1.035	-	-	-	-	5.625	5.705	-
P-Value Δ% FV 2 A	-	0.024	-	-	-	-	0.000	0.000	-
Δ% FV 3 A	2.030	-	2.040	-	-	-	-	-	-
P-Value Δ% FV 3 A	0.000	-	0.000	-	-	-	-	-	-

Sub-sample	PERC. FV 3 n°1	PERC. FV 3 n°2	PERC. FV 3 n°3	PERC. FV 3 n°1	PERC. FV 3 n°2	PERC. FV 3 n°3	PERC. FV 3 n°1	PERC. FV 3 n°2	PERC. FV 3 n°3
Number of observations	NOT SIGNIF.	NOT SIGNIF.	23	NOT SIGNIF.	NOT SIGNIF.	31	NOT SIGNIF.	NOT SIGNIF.	32
F statistic	-	-	412.566	-	-	9.803	-	-	168.700
P-Value F statistic	-	-	0.000	-	-	0.004	-	-	0.000
Adjusted R-squared	-	-	90.39%	-	-	21.29%	-	-	81.25%
Significant EV									
Intercept	-	-	-	-	-	-	-	-	-
P-Value Intercept	-	-	-	-	-	-	-	-	-
Δ% FV 2 A	-	-	-	-	-	-	-	-	5.698
P-Value Δ% FV 2 A	-	-	-	-	-	-	-	-	0.000
Δ% FV 3 A	-	-	2.477	-	-	0.630	-	-	-
P-Value Δ% FV 3 A	-	-	0.000	-	-	0.004	-	-	-

Table A.4. Parameters estimation and tests of significance for Model 4

Model 4 - regr. (ii)	***2009***			***2010***			***2011***		
Sub-sample	***WORLD***	***ITALY***	***USA***	***WORLD***	***ITALY***	***USA***	***WORLD***	***ITALY***	***USA***
Number of observations	*NOT SIGNIF.*	*NOT SIGNIF.*	*NOT SIGNIF.*	*NOT SIGNIF.*	*9*	*NOT SIGNIF.*	*40*	*12*	*NOT SIGNIF.*
F statistic	-	-	-	-	*12,200*	-	*106,949*	*439,226*	-
P-Value F statistic	-	-	-	-	*0.010*	-	*0.000*	*0.000*	-
Adjusted R-squared	-	-	-	-	*47.90%*	-	*81.89%*	*88.47%*	-
Significant EV									
Intercept	-	-	-	-	-	-	-	-	-
P-Value Intercept	-	-	-	-	-	-	-	-	-
Δ% FV 2 net	-	-	-	-	*-1.570*	-	*-4.485*	*-4.906*	-
P-Value Δ% FV 2 net	-	-	-	-	*0.008*	-	*0.000*	*0.000*	-
Δ% FV 3 net	-	-	-	-	-	-	*-54.468*	-	-
P-Value Δ% FV 3 net	-	-	-	-	-	-	*0.000*	-	-

Sub-sample	***PERC. FV 3 n°1***	***PERC. FV 3 n°2***	***PERC. FV 3 n°3***	***PERC. FV 3 n°1***	***PERC. FV 3 n°2***	***PERC. FV 3 n°3***	***PERC. FV 3 n°1***	***PERC. FV 3 n°2***	***PERC. FV 3 n°3***
Number of observations	*NO DATA*	*NOT SIGNIF.*	*NOT SIGNIF.*	*NO DATA*	*NOT SIGNIF.*	*NOT SIGNIF.*	*NOT SIGNIF.*	*NO DATA*	*24*
F statistic	-	-	-	-	-	-	-	-	*279.707*
P-Value F statistic	-	-	-	-	-	-	-	-	*0.000*
Adjusted R-squared	-	-	-	-	-	-	-	-	*91.50%*
Significant EV									
Intercept	-	-	-	-	-	-	-	-	-
P-Value Intercept	-	-	-	-	-	-	-	-	-
Δ% FV 2 net	-	-	-	-	-	-	-	-	*-5.101*
P-Value Δ% FV 2 net	-	-	-	-	-	-	-	-	*0.000*
Δ% FV 3 net	-	-	-	-	-	-	-	-	*-66.286*
P-Value Δ% FV 3 net	-	-	-	-	-	-	-	-	*0.000*

Table A.5. Sample of companies, selected by the criteria specified in section 3

Country	Number of companies	Currency
Austria	2	Eur
Belgium	1	Eur
Brazil	2	Usd
Canada	1	Usd
Chile	1	Usd
France	12	Eur
Germany	3	Eur
Ireland	2	Eur
Italy	18	Eur
Kenya	1	Usd
Panama	1	Usd
Perù	1	Usd
Puerto Rico	4	Usd
Slovenia	1	Eur
Spain	1	Eur
Sweden	3	Usd
Switzerland	2	Usd
Britain	5	Usd
United States	220	Usd