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Disclosure of Fair Value Measurement Techniques of Financial Instruments – Study Applied to the Portuguese Banking Sector According to IFRS 7

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Abstract

The last financial crisis raised a lot of criticism toward fair value measurement and, consequently, the IASB defined in IFRS 7 "Financial Instruments: Disclosures" and IFRS 13 "Fair Value Measurement", the set of disclosures that a company must make regarding the fair value measurement techniques used. The fair value hierarchy concept, introduced in IFRS 7 in 2009, classifies the data used in the measurement according to three levels, of which two levels introduce some subjectivity in the measurement. Hence, this research aims to study the disclosure of fair value measurement techniques of the financial instruments of companies operating in the banking sector in Portugal from 2013 to 2015. Its purpose is to understand whether those financial instruments duly applied the accounting standards that define the required disclosures and analyse the fair value measurement techniques used for financial instruments. The results of the study allow us to conclude that companies operating in the banking sector in Portugal have generally disclosed information on fair value measurement techniques of the financial instruments required by IFRS 7, with the exception of disclosures related to the description of valuation techniques applied for the determination of the fair value of financial assets and liabilities and the reconciliation of changes in the fair value of financial instruments classified at level 3 of the fair value hierarchy. It was also concluded that most financial instruments measured at fair value are classified at level 2 of the fair value hierarchy, which limits the degree of certainty about their values.

Key Words: *Banking Industry, Fair Value, Fair Value Hierarchy, Financial Instruments.*

Introduction

Following the last financial crisis, the International Accounting Standard Board (IASB) issued amendments to International Financial Reporting Standard (IFRS) 7 "Financial Instruments - Disclosures" in 2009 and, in the year 2013, it made the application of IFRS 13 "Fair Value Measurement" mandatory, which complements IFRS 7 in the required disclosures.

With amendments to IFRS 7, a company shall disclose the data used to measure fair value and classify them based on the fair value hierarchy.

The hierarchy consists of three levels:
- Prices quoted in active markets (level 1);
- Inputs other than quoted prices that are directly or indirectly observable (level 2);
- Inputs that are not based on observable market data (level 3).

Several authors (Dantas & Moura, 2015; Pozen, 2009) criticize the use of data classified in levels 2 and 3 of the hierarchy, since they introduce some subjectivity and may include assumptions of the company itself in determining the fair value.

The fair value hierarchy aims to increase the coherence and comparability of fair value measurements and related disclosures by maximising the use of relevant observable data and minimising the use of non-observable data.

In this context, IFRS 7 defines a mandatory set of quantitative and qualitative fair value disclosures. Qualitative information describes risk management objectives, policies and processes. Quantitative disclosures, in turn, provide information about the degree to which the company is exposed to risk, based on the information provided by its management bodies. According to Kunz (2015), these disclosures provide an overview of the use of financial instruments by the company and exposure to the risk they create.

In this perspective, the aim is to assess the extent to which banks operating in Portugal have complied with the disclosures required under IFRS 7, and what are the trends in the classification of financial instruments.

1. Fair Value Measurement and Disclosures of Financial Instruments

IAS 39 adopted by the European Commission, which entered into force in 2005, defined four categories of financial instruments and the respective initial and subsequent measurements (shown in Table 1).

Table 1 - Initial and Subsequent Measurement of Financial Instruments

Financial Instrument Category	Initial Measurement	Subsequent Measurement
Financial assets and liabilities at fair value through profit or loss	Fair Value.	Fair Value, except investments in equity instruments that are measured at cost when they do not have a quoted market price in an active market and if fair value is not reliably measured. Financial liabilities are generally measured at fair value or cost in the situations described in paragraph 47.
Held-to-maturity investments	Fair Value plus transaction costs directly assigned to	Fair value, except those defined in paragraph 9, which are measured at amortised cost. Financial

Financial Instrument Category	Initial Measurement	Subsequent Measurement
	the acquisition or issuance of the financial asset or liability.	liabilities measured at amortised cost using the effective interest method, except for the situations described in paragraph 47.
Loans and receivables	Fair Value plus transaction costs directly assigned to the acquisition or issuance of the financial asset or liability.	Amortised Cost using the effective interest method
Available-for-sale financial assets	Fair Value plus transaction costs directly assigned to the acquisition or issuance of the financial asset or liability.	Fair Value

Source: Adapted from IAS 39.

With the financial crisis that began in 2007, the Group of Twenty (G20), consisting of the nineteen largest economies in the world and the European Union, was in charge of preparing global accounting standards with the aim of creating a single set of high quality global standards. The IASB and the FASB began working together to develop new standards for financial instruments.

The IASB decided to accelerate the project to replace IAS 39 and subdivide it into three main phases: classification and measurement, impairment and hedge accounting (PwC, 2014). IAS 39 contained different classification categories and associated impairment models. Most of the problems in applying IAS 39 were related to the classification and measurement of financial assets. Taking the feedback received into account, the IASB decided that the most effective solution to address these difficulties and help the users of financial statements to better understand the information on amounts, timing and uncertainty of future cash flows was to replace the existing categories for the classification and measurement of financial assets (IASB, 2014). Table 2 presents the main classification differences between IFRS 9 and IAS 39.

Table 2 - IAS 39 vs. IFRS 9 Classification

IAS 39 Classification	IFRS 9 Classification
Based on rules	Based on principles
Complex and difficult to be applied	Classification based on business model and nature of cash flows
Multiple impairment models	Single impairment model
Own credit gains and losses recognised through profit and loss for liabilities with optional fair value application	Own credit gains and losses presented in other comprehensive income for liabilities with optional fair value application
Complex reclassification rules	Reclassification based on business model

Source: Adapted from IASB (2014).

The IASB published the final version of IFRS 9 - Financial Instruments in July 2014 and it is expected to come into force as of January 1st, 2018. IFRS 7 allows users to assess the meaning of financial instruments for the financial position and performance of a company and the nature and extent of the risks associated with financial instruments to which the company is exposed as well as how the company manages those risks. In 2009, as a result of the crisis, IFRS 7 was amended and new disclosures for financial instruments were introduced.

For each class of financial instruments, a company shall disclose the methods, valuation techniques and assumptions applied which means that it shall classify fair value measurements based on a fair value hierarchy according to the inputs used in the measurement. The fair value hierarchy is subdivided into the following levels:

- Level 1, quoted prices (unadjusted) in active markets for identical assets or liabilities;
- Level 2, inputs other than quoted prices included in Level 1 that are observable for the asset or liability, either directly or indirectly;
- Level 3, inputs to the asset or liability that are not based on observable market data (non-observable inputs).

IFRS 7 defines the set of disclosures required for each class of financial instruments:

- The fair value hierarchy level in which all fair value measurements are categorised (level 1, 2, or 3);
- For significant transfers between levels 1 and 2 of the fair value hierarchy, the corresponding amounts and the reasons for the transfers should be disclosed;
- For recurring and non-recurring fair value measurements categorised at level 2 and level 3 of the fair value hierarchy, a description of the valuation techniques and of the fair value measurement data should be disclosed. When changes in valuation techniques occur, they should be disclosed as well as the reasons for the change. Where the change in assumptions is significant, the quantitative information on significant non-observable data used in the measurement should be disclosed for level 3 data;
- For level 3 measurements of the fair value hierarchy, the reconciliation between the opening and closing balances should be disclosed, disclosing the changes separately over the period of the following elements:
  - The total gains or losses for the period recognised in the income, and the 'income' item in which those gains or losses are recognised;
  - The total gains or losses recognised in other comprehensive income, and the 'other comprehensive income' item in which those gains or losses are recognised;
  - Purchases, sales, issues and settlements (disclosed separately);
  - Transfers to or from level 3 and their reasons. For significant transfers to level 3, they should be disclosed separately from level 3 transfers to other fair value hierarchy levels.
- The amount of gains and losses for the period presented in the income statement attributed to gains and losses relating to assets and liabilities held at the end of the reporting period and the description of where such gains and losses are present in the statement of comprehensive income or in the separate income statement.

Quantitative disclosures should be presented in tables, except when another format is deemed more appropriate.

According to Kunz (2015), the recent disclosures required by IFRS 7 contributed to enable users of a company's financial statements to assess the significance of financial instruments for their financial position and performance as well as the nature and exposure to risk of a particular company.

According to Fornaro and Barbera (2007), the fair value hierarchy prioritises the quality and reliability of the information used to define the measurements and to expand the disclosure of specific fair value information per hierarchy level. The new requirements should help users of financial statements to better assess the reliability of fair value information, determine the consistency of their application and improve comparability with other companies. Thus, financial information is considered useful when it improves the ability to make decisions. This information is considered "best" when it has more relevance and reliability.

Fornaro and Barbera (2007) assesses the Statement of Financial Accounting Standards (SFAS) 157: Fair Value Measurements (a FASB accounting standard), which introduces the concept of a fair value hierarchy, and concludes that it contributes to a more relevant and useful information as follows:

- Companies have a better orientation in the considerations they make, when making assumptions for level 2 or level 3 fair value calculations when there are no data in the active market for similar assets and liabilities;
- Users of financial statements are aware of the extent of fair value measurements: if they are based on observable or non-observable data;
- The disclosure of the fair value hierarchy contributes to greater transparency and perception of the degree of subjectivity and judgment present in fair value measurement techniques;
- In the standard, guidelines are presented for cases where significant data comes from more than one hierarchy level.

Relevance is the ability of information to make a difference in the decision-making process (Fornaro & Barbera, 2007). Hence, relevance increases when information provided by the fair value hierarchy helps in evaluating the future results of the company, confirms previous expectations and is available in a timely manner. Conversely, information reliability improves when users have fair value measurements that are more reliable and unbiased.

Table 3 shows the degree of relevance for each of the fair value hierarchy levels. Financial information is more relevant to level 1 of that hierarchy.

Table 3 - Degree of relevance by fair value hierarchy level

Degree of Relevance	Level	Information origin	Example
Higher	1	Unadjusted quoted prices in active markets for identical assets and liabilities;	Investment in common shares of a listed company in the National Association of Securities Dealers Automated Quotations (NASDAQ).
Medium	2	Unadjusted quoted prices of assets or liabilities that are similar and traded in active markets; are traded in more liquid markets and other observable inputs.	Investment in debt securities of companies that are not traded in an active market. Fair value is determined based on the equivalent bonds traded on the New York Stock Exchange (NYSE).
Lower	3	Market data are not sufficient. Fair value is determined on the basis of non-observable inputs that reflect the assumptions made by market participants and one or more valuation techniques.	Specialised machinery where there is little market data. Fair value is measured using the present values of projected future cash flows.

Source: Adapted from Fornaro and Barbera (2007).

Conversely, the fair value hierarchy raises some questions regarding the reliability of fair value presented, especially for level 3 data that is used to estimate fair value. In paragraph C87 of SFAS157, the FASB recognises that some level 3 data of a hypothetical nature may appear to be of questionable relevance for the users of financial statements. However, in general, the FASB believes that the hierarchy improves, for the most part, the reliability of the measurements and relevance in the decision-making process (Fornaro & Barbera, 2007).

The advantages of the fair value hierarchy can also be assessed through improvements in the comparability and consistency of fair value information.

Comparability increases when the fair value hierarchy allows different companies to measure and disclose the fair values of their assets and liabilities in a similar way. Consistency, in turn, improves when a company can measure its fair values from one period to another in a similar way. The fair value hierarchy improves the comparability and consistency of financial information due to the following factors:

- All companies should follow the same guideline to identify, classify and use the best data for their measurement techniques;
- Data for certain assets and liabilities must be obtained and classified in a similar way using the new hierarchical structure;
- Price inconsistencies of some level 1 data are eliminated. For example, in cases where the company holds a significant weight of a particular asset (the prohibition of blockage discounts) and adjustments to the values of restricted securities;
- The newly required disclosures ensure a minimum level of clarity and similarity in having the measurement techniques presented in a structured manner;
- The disclosures of interim reports of fair value measurements provide users with the most current and timely information.

On the other hand, despite the advantages presented for some situations, the fair value hierarchy does not always contribute to improved comparability. As an example, to measure the fair value of intangible assets, it is necessary to use present value techniques that incorporate level 2 and 3 data. In these cases, management bodies must determine a set of data that depend of the degree of subjectivity, such as the main or the most advantageous market for the asset, the underlying assumptions and inputs that market participants would use to value the asset, the measurement techniques appropriate to the circumstances, the significance of each input in the determination of fair value and the classification of the measurement itself within the hierarchy for disclosure. Therefore, for identical assets, a different degree of subjective judgment may result in different fair value measurements and disclosures.

Marra (2016) studied the advantages and disadvantages of fair value measurement based on the studies carried out to date and presents the conclusions shown in Table 4.

Table 4 - Advantages and disadvantages of fair value measurement

Fair value measurement advantages	Fair value measurement disadvantages
Despite the criticisms raised about deficiencies associated with fair value accounting, it is difficult to identify better alternative methods to meet the requirements in accounting standards regarding the relevance, reliability, comparability and comprehensibility of financial information (Véron, 2008; Petroni & Wahlen, 1995; Barth et al., 1995; Eccher, Ramesh & Thiagarajan, 1996; Nelson, 1996).	The implementation of fair value accounting fails and the valuation process is unreliable when the ratio of output values to fair values for shareholders is not sustained (Penman, 2007).
Several authors recognise the relevance of the disclosure of fair values of financial instruments such as securities and derivatives held by financial institutions (Venkatachalam, 1996; Park, Park & Ro, 1999).	The use of fair values and market-based valuations in periods when markets are not liquid, such as during financial crises, is a cause for concern of researchers (Hughes & Tett, 2008; McCreevy, 2008).

Level 3 measurements, based on models, provide investors with useful information (Kolev, 2008).	The use of fair value measurements reduces the quality of earnings information since changes in fair value are unpredictable making it more difficult to identify the recurring part of the gain (Dichev & Tang, 2008).
Fair value measurements provide a forecast of future possible accounting profits (Evans, Hodder & Hopkins, 2014).	Management decisions in the valuation models can be used for private gains (Shalev, Zhang & Zhang, 2013).

Source: Adapted from Marra (2016).

Fair value is often relevant in the decision-making process, but the inputs used to measure fair values cannot always be objectively measured (Landsman, 2007 apud Clor-Proell, Proell, & Warfield, 2014)[1].

Tabara and Rusu (2011) argue that abandoning fair value accounting is not a viable solution. Historical cost measurement provides less information, is less comparable and much less relevant as it leads to a systematic undervaluation of the assets by not considering the effects of rising market prices.

Kothari and Lester (2012) highlight that irresponsible lending and a lack of regulatory oversight have triggered the financial crisis, but the poor implementation of fair value accounting standards was one of the factors that caused and prolonged the last financial crisis.

As a solution to the weaknesses in financial reporting that were observed during the financial crisis, the IASB amended IFRS 7 in 2009 and, in the year 2013, it issued IFRS 13 with the aim of improving fair value measurement disclosures. With the changes in accounting regulations, some studies were carried out in this topic.

According to Chung, Lee and Mitra (2016), most fair value accounting studies are focused on the financial sector (banks, insurance companies and other financial institutions), because fair value assets have a greater weight in this sector. According to the Standard & Poor's Compustat database, the proportion of assets measured at fair value over total assets in US listed companies increased from 18.8% in 2008 to 20.3% in 2013, while in the financial sector it went from 25.8% in 2008 to 29.3% in 2013. Assets measured using level 2 and 3 techniques represent, in the financial sector, 18.6% and 2.9% respectively , while in the non-financial sector, the ratio is 4.8% and 2.9%.

Pozen (2009) reports that in the first quarter of 2009, level 3 assets of the nineteen largest US banks increased 14.3% compared to the first quarter of 2008. The author explains this increase by the fact that when banks can make reasonable assumptions based on their own estimates, they create a more optimistic view of their financial condition.

Kaya (2013) also criticizes the subjective nature of level 2 data and especially level 3, which contradict the very nature of accounting with the involvement of hypothetical estimates. The data used cannot be underestimated because of the importance they have and because they are susceptible to manipulation. Observable data used in levels 1 and 2 of the fair value hierarchy include data sources and market prices that are available and visible outside the company and recognised through independent sources. Observable data are external to the company and more objective than level 3 non-observable data. Level 3 data consists of the data and analysis developed within the company itself to assess the fair value.

[1] Landsman, W. (2007). Is fair value accounting information relevant and reliable? Evidence from capital market research. *Accounting and Business Research* (Special Issue): 19–30.

Investors argue that the preferred fair value measurement models are mark-to-market and not mark-to-model accounting (Gassen & Schwedler, 2008 apud Kunz, 2015)[2].

Dantas and Moura (2015) studied the degree of reliability regarding the fair value of financial instruments of Brazilian banks, based on the composition of the fair value hierarchy disclosed by these companies in their financial statements for the period from 2010 to 2012. The empirical results regarding the financial assets showed that, during the period under review, there was an increase in level 1 (67% in 2012) and a proportional reduction in level 2 and 3 measurements. In relation to financial liabilities, the majority is classified in level 2 of the hierarchy "which represents less reliability combined with a reduction of the ratio classified in level 1" (Dantas & Moura, 2015: 187).

Song, Thomas and Yi (2010) studied the financial statements of 431 banks for the year 2008 and analysed how investors assign prices to level 1, 2 and 3 data assets and concluded that the stock market appreciates every dollar for $0.98 for level 1 assets, $0.97 for level 2 assets and $0.68 for level 3 assets. This decline in level 3 asset valuation shows that investors are concerned about the reliability of estimates made by managers for fair values. The results suggest that investors tend to decrease the weight of level 3 fair value measurements in their equity-pricing decisions due to information risk and potential inherent estimation errors. They also concluded that the increase in asset valuations for each level is consistent with strong governance that reduces information asymmetries and mitigates estimation errors, especially for level 3 assets of the fair value hierarchy. In level 3 data defined by the company, higher information asymmetry is expected. The most comprehensive disclosure of level 3 fair value estimation procedures can lessen the concerns of researchers, mitigate the discount rate associated with level 3 estimates and help the capital market to more accurately assess the economic value of the estimates. Further disclosure of level 2 measurement techniques will help to present financial statements with more information. Although, at level 2, the estimation process is more objective than at level 3, it does, however, depend on managers' criteria. For example, in level 2 estimates, companies can use market information, such as the yield curve or empirical correlation, but the fair value depends on the model the company selects.

Goh, Li, Ng and Ow Yong (2015) studied how researchers evaluate the fair value estimates according to SFAS 157 in the period from 2008 to 2011. Researchers continued the analysis by Song et al. (2010) with the aim of studying investors' perceptions on fair value estimates when market conditions change. The results show that level 3 fair value estimates are evaluated with lower values than levels 1 and 2 estimates. However, the differences between levels have been decreasing in the period under analysis. In 2011, the stock market appreciated every dollar for $1.00 for level 1 assets, $0.95 for level 2 assets and $0.88 for level 3 assets, thus suggesting that with more favourable market conditions, the concerns of investors in relation to level 3 estimates decrease.

Song (2015) studied the impact that market volatility has on the value investors assign to fair values, using data from 295 US financial institutions in the period between 2008 and 2013. The author concluded that market volatility impacts fair value prices based on market values, that is, levels 1 and 2, but investor prices for level 3 fair values are not affected by market volatility.

Kunz (2015) studied fair value disclosures of financial instruments in the consolidated financial statements of banks listed on the Warsaw Stock Exchange from 2009 to 2013. With the amendments to IFRS 7, there were no significant changes in the level of information about the valuation techniques and the banks applied the fair value hierarchy in their financial assets and liabilities. This information facilitates the assessment of the impact of fair value estimation risk on the bank's financial position, as represented in the financial statements (Kunz, 2015). The level of qualitative disclosures increased after the implementation

[2] Gassen, J. & Schwedler K. (2008), *SURVEY*: *The View of European Professional Investors and their Advisors. Attitudes towards Fair Value and Other Measurement*, Humboldt-Universität zu Berlin.

of IFRS 13. However, the author concluded that despite the evolution in disclosure, information about measurement methods and assumptions applied to valuation techniques are not sufficient considering the analysed financial statements. In relation to financial assets in the years 2008 and 2009, the greater weight is of level 1, and level 3 data represent a weight of 14% and 8%, respectively. As for financial liabilities, in 2009, 93% were classified at level 2 of the fair value hierarchy. In the literature, no research was found on the impact of IFRS 13 on the level of fair value disclosures in the financial statements (Kunz, 2015).

Therefore, in analysing the results obtained by the studies conducted (Dantas & Moura, 2015; Kunz, 2015; Chung et al., 2016), it shows most financial assets measured at fair value are classified at level 1 of the fair value hierarchy.

Regarding financial liabilities, the studies (Dantas & Moura, 2015; Kunz, 2015) show that most liabilities measured at fair value are classified at level 2 of the hierarchy. The results are consistent with the research of Leggett, Wilkins and Clark (2015) who studied liabilities measured according to the fair value hierarchy of all US companies in the Compustat database. The authors concluded that in the periods between 2008 and 2012, level 2 and 3 data are the most used in the measurement of financial liabilities and registered increases in the analysed period.

Table 2.5 presents the main studies in the field of fair value measurement techniques.

Table 5 - Studies of fair value measurement techniques

Scope of the study	Study	Authors	Main findings
Fair Value Hierarchy Measurements	Fair value hierarchy of the financial instruments of Brazilian banks.	Dantas and Moura (2015)	In the period from 2010 to 2012, approximately 67% of financial assets classified as level 1 and more than 50% of financial liabilities are classified at level 2.
	Fair Value Hierarchy of the financial liabilities of US companies.	Leggett et al. (2015)	Between 2008 and 2012, level 2 and 3 data are the most used in the measurement of financial liabilities and have a positive evolution in the analysed period.
	Fair Value Hierarchy of the financial assets of US companies.	Chung et al. (2016)	Assets measured using level 2 and 3 techniques represent, in the financial sector, 18.6% and 2.9% respectively.
Fair Value Measurements: level 2 and 3	Theoretical approach to the subjective aspects of level 2 and 3 fair value measurements.	Pozen (2009) Kaya (2013)	Level 3 data are subjective.
Risk perception of investors according to the fair value hierarchy	The prices that investors assign to each of the fair value hierarchy levels over the years and the impact of market volatility.	Song et al. (2010)	Investors value prices lower than level 3 assets.
		Goh et al. (2015)	The differences in investor prices have been declining among hierarchy levels.
		Song (2015)	Market volatility has an impact on level 1 and 2 fair value prices.
Disclosures of measurement techniques	Disclosures of measurement techniques in accordance with IFRS 7 and IFRS 13.	Kunz (2015)	Most of the financial assets are classified at level 1 of the hierarchy and 14% in level 3 in 2008. In 2009, 8% of the assets is classified in level 3. For financial liabilities, the weight is 91% and 93% in 2008 and 2009, respectively.

Empirical Study

Objectives

The objectives of this study were, on the one hand (i) to study the application of accounting standards by banks operating in Portugal, in terms of quantitative and qualitative disclosures of fair value measurement techniques of financial instruments established in IFRS 7 and, (ii) to analyse the composition of the levels of the fair value hierarchy for financial assets and liabilities and to evaluate their evolution in the period under analysis.

Methodology

In order to carry out the study, all the financial statements of banks operating in Portugal from 2013 to 2015 were analysed. Taking as a starting point the banks operating in Portugal registered in the Portuguese Banking Association (Associação Portuguesa dos Bancos - APB), whose members represent more than 90% of the assets of the Portuguese banking system, the sample was defined according to the existence of the individual financial statements for the period in question.

Based on the disclosures required by IFRS 7, the items that should be used in assessing the application of accounting standards were identified. Table 6 shows a correspondence between the items that are part of the disclosure index and the disclosures required by IFRS 7 regarding techniques for measuring the fair value of financial instruments.

Table 6 - Disclosures required by IFRS 7 for each item in the disclosure index

Disclosure index items	Disclosures required by IFRS 7
Description of the classification principles of financial assets and liabilities according to the appropriate fair value hierarchy levels (Dis. 1).	Disclosure of information regarding the fair value hierarchy and explanation of the data used at each level of the hierarchy.
Description of valuation techniques applied to the fair value of financial assets and liabilities (Dis. 2).	Disclosure of the description of the techniques used for assessing level 2 and 3 data and presentation of the quantitative information of the data used. When there are significant transfers between levels 1 and 2 of the fair value hierarchy, the corresponding amounts and the reasons for the transfers should be disclosed.
Specificity and comprehensibility of numerical data on the fair value of financial assets (Dis. 3).	Disclosure of quantitative data used to determine the fair value of financial instruments. For each class of financial assets and liabilities measured at fair value, its structure must be disclosed according to the fair value hierarchy levels.
Specificity and comprehensibility of numerical data on the fair value of financial liabilities (Dis. 4).	
Reconciliation of changes in the fair value of financial instruments classified in level 3 of the fair value hierarchy (Dis. 5).	Disclosure of reconciliation between the opening and closing balances. Applicable when a company discloses that it uses fair value measurement at level 3 data and when there is a variation from the previous period.

Source: Adapted from Kunz (2015).

The disclosure of the abovementioned items became mandatory with the amendments made to IFRS 7 in 2009. The valuation scale that was used is 0 to 2, where 0 corresponds to lack of disclosure, 1 insufficient information and 2 information disclosed in accordance with accounting regulations.

In order to determine if all the items are adequately disclosed by banking institutions in Portugal, a descriptive analysis of the data was carried out using Friedman's non-parametric test, since there is no evidence about the normality of the distributions observed for each one of the disclosure items, with the purpose of concluding if any of the five disclosures behave significantly different from the others.

Sample

The banks registered in the APB and the existence of individual financial statements available for the periods under analysis were considered in the sample definition.

The sample was composed in 2013 by seventeen banks, in a total of twenty-two APB associated banks representing (77% of the banks operating in Portugal). In 2014, of the total of twenty-one associated banks, we considered sixteen banks in our sample, representing (76% of the banks). In 2015, seventeen banks were studied in a total of twenty-three banks, accounting for 74% of the researched banks. Hence, it is considered that the sample studied in the several years is representative, allowing to draw conclusions applicable to the banks under study.

Table 7 presents, for each of the analysed periods, the banks operating in Portugal for which it was possible to obtain the respective individual financial statements and which make up the sample under study.

Table 7 – Sample Composition

2013	2014	2015
Banco BIC Português	Banco BIC Português	Banco BIC Português
Banco Bilbao Vizcaya Argentaria (Portugal)	Banco Bilbao Vizcaya Argentaria (Portugal)	Banco Bilbao Vizcaya Argentaria (Portugal)
Banco BPI	Banco BPI	Banco BPI
Banco Carregosa	Banco Carregosa	Banco Carregosa
Banco Comercial Português	Banco Comercial Português	Banco Comercial Português
Banco Credibom, SA	Banco Credibom, SA	Banco Credibom, SA
Banco Finantia	Banco Finantia	Banco Finantia
BANIF	BANIF	
Banco Invest	Banco Invest	Banco Invest
Banco de Investimento Global	Banco de Investimento Global	Banco de Investimento Global
Banco Popular Portugal	Banco Popular Portugal	Banco Popular Portugal
Banco Santander Totta S.A	Banco Santander Totta S.A	Banco Santander Totta S.A
Caixa Central de Crédito Agrícola Mútuo	Caixa Central de Crédito Agrícola Mútuo	Caixa Central de Crédito Agrícola Mútuo
Caixa Económica Montepio Geral	Caixa Económica Montepio Geral	Caixa Económica Montepio Geral
Caixa Geral de Depósitos	Caixa Geral de Depósitos	Caixa Geral de Depósitos
Banco Espírito Santo de Investimento	Banco Espírito Santo de Investimento	Haitong Bank
Banco Espírito Santo		Novo Banco
		Banco CTT SA

Results

(i) Regarding the application of the accounting standards by banks operating in Portugal, concerning the quantitative and qualitative disclosures of fair value measurement techniques of the financial instruments established in IFRS 7.

Table 8 shows the results obtained for the disclosures required by IFRS 7 resulting from the analysis of the notes to the individual financial statements of the sampled banks for the period under review.

Table 8 - Average valuation of the disclosures from banks operating in Portugal

Analysed items	2013	2014	2015
Description of the classification principles of financial assets and liabilities according to the appropriate levels of the fair value hierarchy (Dis. 1)	1.529	1.563	1.500
Description of valuation techniques used to determine the fair value of financial assets and liabilities (Dis. 2)	1.294	1.250	1.222
Specificity and comprehensibility of numerical data on the fair value of financial assets (Dis. 3)	1.529	1.563	1.500
Specificity and comprehensibility of numerical data on the fair value of financial liabilities (Dis. 4)	1.412	1.438	1.389
Reconciliation of changes in the fair value of financial instruments classified in level 3 of the fair value hierarchy (Dis. 5)	0.714	0.571	0.800

The mean ranks resulting from the Friedman test are reproduced in Table 9, below:

Table 9 – Mean Ranks of Friedman Test

Disclosure	2013	2014	2015
Dis 1	3.32	3.32	3.32
Dis 2	2.89	2.89	2.71
Dis 3	3.32	3.32	3.29
Dis 4	3.32	3.32	3.29
Dis 5	2.14	2.14	2.39

The statistics resulting from the test performed for each of the years are reproduced in table 10, as follows:

Table 10 – Friedman Test Statistics

	2013	2014	2015
N	14	14	14
Chi Square	17.617	17.617	11.129
Df	4	4	4
Asymp. Sig.	0.001	0.001	0.025

For a significance level of 5%, the results for the years under analysis lead to a rejection of the null hypothesis, that is, not all the disclosures under analysis provided for in IFRS 7 have an identical behaviour, being observable by the mean ranks described in the table 9, that disclosure 2 (Description of valuation techniques applied for the fair value determination of financial assets and liabilities) and disclosure 5 (Reconciliation of changes in the fair value of financial instruments classified at level 3 of the fair value hierarchy) show more reduced disclosure levels than the others.

(ii) At the composition level of the fair value hierarchy levels for financial assets and liabilities: The results described in table 11 and 12 below present the percentage of financial institutions that used each of the levels for each class of assets and liabilities reported at the level of their financial statements.

Table 11 - Fair value hierarchy of financial assets

Class of financial assets	2013	2014	2015
Financial assets held for trading			
Level 1	35.63%	33.35%	35.94%
Level 2	54.19%	48.79%	51.44%
Level 3	10.18%	17.86%	12.62%
Available-for-sale financial assets			
Level 1	35.47%	60.12%	55.23%
Level 2	45.24%	20.04%	22.67%
Level 3	19.29%	19.84%	22.10%
Hedge derivatives			
Level 1	0.00%	0.00%	0.00%
Level 2	78.65%	74.38%	77.25%
Level 3	21.34%	25.62%	22.75%
Held-to-maturity financial assets			
Level 1	58.92%	61.77%	28.34%
Level 2	21.97%	38.23%	71.66%
Level 3	19.12%	0.00%	0.00%
Derivative Financial Instruments			
Level 1	0.00%	0.00%	0.00%
Level 2	100.00%	100.00%	100.00%
Level 3	0.00%	0.00%	0.00%
Financial assets at fair value through profit or loss			
Level 1	74.04%	33.39%	67.79%
Level 2	1.88%	33.48%	0.00%
Level 3	24.07%	33.13%	32.31%
Customer credit			
Level 1	0.00%	0.00%	0.00%
Level 2	50.00%	50.00%	60.07%
Level 3	50.00%	50.00%	39.93%
Risk management derivatives			
Level 1	0.00%	0.00%	0.00%
Level 2	100.00%	100.00%	100.00%
Level 3	0.00%	0.00%	0.00%
Trading Derivatives			
Level 1	0.00%	0.02%	0.02%
Level 2	20.63%	10.52%	10.97%
Level 3	79.37%	89.46%	89.01%

Table 12 - Fair value hierarchy of financial liabilities

Class of financial liabilities	2013	2014	2015
Financial liabilities held for trading			
Level 1	1.49%	11.08%	12.59%
Level 2	78.48%	68.82%	96.01%
Level 3	20.03%	20.11%	11.40%
Hedge derivatives			
Level 1	0.00%	0.01%	0.00%
Level 2	84.89%	85.02%	85.53%
Level 3	15.11%	14.97%	14.47%
Financial liabilities designated at fair value			
Level 1	0.00%	0.00%	na
Level 2	100.00%	100.00%	na
Level 3	0.00%	0.00%	na
Trading Derivatives			
Level 1	0.01%	0.02%	0.01%
Level 2	88.98%	93.03%	93.85%
Level 3	11.02%	6.95%	6.14%
Central bank resources			
Level 1	100.00%	100.00%	100.00%
Level 2	0.00%	0.00%	0.00%
Level 3	0.00%	0.00%	0.00%
Customer resources and other loans			
Level 1	0.00%	0.00%	0.00%
Level 2	66.67%	50.35%	66.82%
Level 3	33.33%	49.65%	33.18%
Liabilities represented by securities			
Level 1	0.00%	0.00%	0.00%
Level 2	75.00%	70.05%	68.26%
Level 3	25.00%	29.95%	31.74%
Risk management derivatives			
Level 1	0.00%	0.00%	0.00%
Level 2	100.00%	100.00%	100.00%
Level 3	0.00%	0.00%	0.00%
Subordinated liabilities			
Level 1	0.00%	0.00%	0.00%
Level 2	100.00%	100.00%	66.67%
Level 3	0.00%	0.00%	33.33%
Resources from other credit institutions			
Level 1	47.37%	94.55%	0.00%
Level 2	52.63%	5.45%	51.75%
Level 3	0.00%	0.00%	48.25%

Table 13 aims to compile the detailed information contained in Table 11 and 12 above, in order to better understand the intensity of data utilization at each level:

Table 13 - Fair value hierarchy of financial assets and liabilities

	2013	2014	2015
Financial assets			
Level 1 data	20.59%	20.96%	20.81%
Level 2 data	57.17%	52.83%	54.90%
Level 3 data	22.24%	26.21%	24.29%
Financial liabilities			
Level 1 data	14.89%	20.57%	12.51%
Level 2 data	74.66%	67.27%	67.66%
Level 3 data	10.45%	12.16%	19.83%

Most banks operating in Portugal (82%) have disclosed, in the notes to the individual financial statements, the required information regarding the description of the classification principles of financial assets and liabilities, according to fair value hierarchy levels and the description of the valuation techniques used to determine fair value.

Most banks, 64%, that use level 3 data to measure the fair value did not disclose the reconciliation of changes in the fair value of financial instruments.

Most financial assets measured at fair value are determined based on level 2 data, and the fair value hierarchy has a regular behaviour in the three analysed periods.

In relation to financial liabilities, 70% of the banks disclosed quantitative information. For financial liabilities, the behaviour is similar to that of financial assets, that is, a preponderant weight of level 2 data is noted. However, the weight of level 3 data increased significantly during the analysed period.

Conclusions

The present research studied the disclosure of fair value measurement techniques of financial instruments in the Portuguese banking sector in the period from 2013 to 2015. In this study, disclosures made regarding the measurement techniques used in determining the fair value were analysed.

Based on the analysis, we conclude that banks operating in Portugal satisfactorily disclose the information regarding techniques for measuring the fair value of the financial instruments required by IFRS 7, but the description of the valuation techniques used for the fair value determination of financial assets and liabilities and the reconciliation of changes in the fair value of financial instruments classified at level 3 of the fair value hierarchy are disclosure items that require improvement.

As to the level obtained from the measurement techniques, the financial assets and liabilities of banks operating in Portugal are mostly measured on the basis of level 2 non-observable data of the fair value hierarchy, which limits the degree of certainty about their values.

This reality is similar with US companies and Brazilien and Poland's banks in what concerns to financial liabilities. However, their financial assets are mostly measured on the basis of level 1 data of the fair value hierarchy. Thus, in Portugal there is room for improvement of the measurement techniques used by these companies.

Future research on this subject will be able to deepen the methodologies used by banks within each data level. Similarly, the scope of the study may be extended to companies operating in the financial sector, meaning those other than banks.

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