



## Accounting Standards and Market Value of Firms with Pension Plans

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### ABSTRACT

This article investigates the impact of the adoption of International Accounting Standards on the market value of non-financial listed firms of the Euronext Lisbon Stock Exchange, in the PSI-20. The study of the impact of these standards is focused on the items of the Financial Statements, particularly on items subjected to the criteria of the fair value of assets and liabilities of pensions. Most of these companies have obligations to pay annuity benefits, particularly for retirement, which are managed by outsourced independent companies, such as pension funds and life insurance companies. By using a panel of the largest non-financial companies during the period 2004-2010, the results show that the setting of the fair value of those liabilities in the post-2005 period affects the market value of firms, not only on account of the adoption of the standards, but also due to the effect of the 2008 stock market crash.

**Keywords:** Companies valuation, financial crisis, International Accounting Standards (IAS), IFRS, pension plans.

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### 1.0 INTRODUCTION

The valuation of companies depends on the accounting standards adopted on the financial statements. The pension liabilities are usually related with defined benefits plans. However, its recognition constrains the listed companies' market value and the investors position. In Portugal the majority of listed companies have yet defined benefits plans. This article discusses the impact of the accounting standards as well as the perception of the crisis and the relevance of pension liabilities on market value of non-financial companies.

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In Portugal listed non-financial firms have pension funds, which are usually complementary to the public social security system, while the banking financial companies have a social insurance scheme, as an alternative to the public social security system. This study focuses on pension funds of non-financial companies. Regulation N.1606/2002 of the European Commission, which came into force in January 2005, imposes the mandatory presentation of financial reporting of Portuguese-listed companies in accordance with the IFRS/IAS standards (IFRS - International Financial Reporting Standards, IAS - International Accounting Standards).

The main purpose of this article is to examine the effect that carrying out the necessary accounting changes has had on the corporate value of a sample of Portuguese companies listed on the Euronext (PSI-20) and to analyse an empirical test of the effect of the 2008 stock market crash on the value of companies, taking into account the manner in which the concept of fair value of assets was applied. As most of these companies have net actuarial liabilities with defined benefit pension plans, it is relevant to identify, in particular, to what extent the adoption of the IAS 19 influences the value of these companies. Thus, data from non-financial companies with pension plans listed during the period 2004-2010 is used to estimate the coefficients of the accounting valuation models through sophisticated techniques of the panel regression. The impact of accounting standards on equity and net profit has been studied in other European countries, notably that concerning any changes in financial statement items. The literature used in European studies, such as those developed by (Perramon and Amat, 2006), (Gueifão, 2007), and (Horton and Serafeim, 2008), stress that pensions and other social benefits are the most important cause of adjustments in accounting changes. In Portugal, there are still very few studies of the impact of international standards, specifically on the implementation of IAS 19. Therefore, it is worthwhile examining a test whether or not these effects are confirmed for Portugal.

The paper has been divided into five sections: Section I introduces the topic and Section II reviews the literature on the adoption of IFRS / IAS. The methodology and the sample are presented in Section III. The estimated results and discussion are the subject of Section IV. Finally, Section V presents the main conclusions of the research.

## 2.0 LITERATURE REVIEW

The adoption of IAS/IFRS has promoted several studies about its impact on performance and the financial position of companies in different countries. From the overall financial point of view, the benefits of this adoption are more numerous than the disadvantages (Liu *et al.*, 2011). Regarding benefits, the incentive for the development of the stock market is often cited, either due to increased transparency and comparability or owing to the attraction of direct foreign investment. Concerning disadvantages, the cost involved in implementing the standards is mainly cited. In the specific domain of accounting and finance, a set of studies centres on certain financial reports (Adams *et al.*, 1993; Jermakowicz, 2004; Horton and Serafeim, 2008), other studies on trends ratios (Aisbitt, 2006), and others on both (Hung and Subramanyam, 2007; Tsalavoutas *et al.*; 2012). The majority of empirical studies focuses on the identification of financial statement items that are the most affected, i.e., those with the largest variations after the adoption of the new accounting standards. The evaluation of some elements of the balance sheet at fair value criterion has been frequently cited in these studies, as it is the kind of measure that can determine the value of assets and cause results to become more volatile (Callao *et al.*, 2007), although other authors argue that the adoption of international accounting standards has positive effects on the growth and competitiveness of European companies, as well as on European financial markets (Jermakowicz, 2004).

In (other empirical studies reported in the literature on this subject, the effects of the transition to IAS on total assets and shareholders' equity varies from country to country, on account of the specificities of national accounting systems previously used. (Hung and Subramanyam, 2007) and Liu *et al.* (2011) respectively found positive effects on the worth of the company, as measured by the value of balance sheet assets, shareholders' equity and net income, both in Germany and in China.

Regarding the UK, (Aisbitt, 2006) concludes that changes in the book value of shareholders' equity may be relevant in terms of the interpretation of financial statements made within the framework of financial analyses of the company. (Horton and Serafeim, 2008) reported that lower values of net profit after the adoption of international standards in the UK, are due primarily to adjustments to the impairment of goodwill, the social benefits of employees and deferred taxes. In Spain's case, (Perramon and Amat, 2006) also find the same effects of goodwill and social benefits on corporate earnings, as well as effects on financial assets due to the criteria of fair value. In Greece, (Tsalavoutas et al., 2012) found that transition accounting positively influences shareholders' equity, although certain IAS have caused a negative impact on assets, such as, for instance, IAS 19 (Employee Benefits) and IAS 38 (Intangible Assets). (Liao et al., 2012) concluded that, in French and German cases, the value of earnings and book values assets are comparable between the preceding year and the following year, but are less comparable in the subsequent years. The same authors argue that the quality of financial reporting after adopting IFRS, varies from country to country, due to the institutional and cultural specificity of each country. In the case of Portugal, there are also studies in which more importance is attributed to organizational resistance within companies, than to other factors related to entrepreneurial dimension, profitability and audit requirements. The latter is considered less relevant in explaining the level of preparation for the adoption of the accounting standard system by unlisted companies in 2010 (Guerreiro et al., 2012).

(Gueifão, 2007) analyses the impact of IAS is using a sample of European countries, concluding that there is a multiplicity of effects. For Portugal, profits increase whilst shareholders' equity suffers a negative impact. The author concludes that IFRS 3 (business combinations) and IAS 19 (Employee Benefits) are the accounting standards that best explain the differences in values encountered in the implementation of all IFRS / IAS. Several studies point out weaknesses and difficulties in comparing the implementation of IAS 19 in Europe, owing to different choices of accounting policies regarding the methods of accounting for actuarial gains and losses (Morais, 2008). In an early work, (Fasshauer et al., 2008) recommend a full recognition of actuarial gains and losses, in order to prevent companies from using the off-balance sheets as a mechanism to present the majority of pension liabilities. Currently, IAS 19 states that the net defined benefits liability (or asset) should be recognized in the statement of financial position. In accordance with this, these authors are opponents of the corridor method for the recognition of actuarial gains and losses. They determined a ratio between gains and losses not recognized and capital, based on the average, and concluded that the ratio is higher for two Portuguese companies (11%), eight German ones (11%) and four Irish ones (16%). The IASB amendments to IAS 19 in 2012 implemented that recommendation, when the corridor method was eliminated.

In the case of Portugal, there are few studies on the transition or adoption of IAS, particularly focusing on periods longer than two years. (Cordeiro et al., 2007) highlights reduction in shareholders' equity (-3.19% on average) and an increase in net income (14.66% on average), contrary to most of the aforementioned studies. Additionally, they do not present any evidence from the analysis of different procedures for adoptions between different sectors of business. In other studies, (Lopes and Viana, 2008) also find the same as (Perramon and Amat, 2006), regarding the analysis of intangible assets, goodwill and financial assets, indicating that these items are responsible for the strong variations in the total assets of Portuguese enterprises. On one hand, (Morais and Curto, 2008) conclude that there was an improvement in the results, as they exhibit smoothing on the results, since companies have adopted international standards, yet on the other hand, the value of the importance of accounting information decreased with the adoption of IASB standards. (Albuquerque et al., 2011), through a questionnaire, find support for asserting that accountants in Portugal have a lower predisposition to take risks related to professional practice, such as those related to the adoption of measurement criteria based on market value. (Guerreiro et al., 2008), in a study on the characteristics of enterprises in adopting IFRS, conclude that small firms operating independently and not audited by one of the Big 4 audit firms, are likely to have a reduced propensity to implement IFRS voluntarily. The authors of another study found that large, unlisted Portuguese companies have been motivated by institutional demands to change to IFRS, which has a common-law institutional logic, where benefits are clearly positive (Guerreiro et al.; 2012b).

Finally, this literature review highlights that the majority of previous studies focused on the transition from the IAS in only one year (2005), but none of them demonstrates the effects of standards on the market value of firms in the post-2005 period using more than two years. Therefore, this article aims to tackle this issue by studying the impact of the adoption of IFRS on the market value of firms, including the effect of the stock market crash and pension liability standards.

### 3.0 METHODOLOGY AND DATA

A panel of financial data from companies was analyzed with repeated observations over a number of periods. This procedure allowed for a more realistic specification and estimation of models, than a single horizontal section or a single time series. A set of estimators of the regression model allowed for heterogeneity among firms and between periods, but confined this possibility to the terms of intersection. The discussion usually found in the econometric literature on the choice between fixed effects models and random effects models, was not one of the objectives of this investigation, but, in this case, there is evidence that the fixed effects model is useful, if focused on differences between companies (Verbeek, 2012).

At a certain point in 2005, Portuguese companies listed on the Stock Exchange, began to adopt the IAS / IFRS. The first hypothesis studied, was whether the transition to the rules of IFRS / IAS influences corporate fair value later on. The second hypothesis examined, was to evaluate to what extent the financial crash of 2008 affected the value of companies after the adoption of these standards. Bearing in mind that most listed companies have actuarial liabilities in pension funds, the third hypothesis that was tested, was the influence of a variable that captures the effect of net liabilities with defined benefit pension plans on companies' value. Of the 59 companies listed on Euronext Lisbon in late July 2012, all non-financial companies in the PSI-20 Index between 2004 and 2010 were selected. Two samples were used: one containing all non-financial companies listed, including the PSI-20 Index, which are usually the largest listed corporations that have adopted the standards IAS since 2005, and the other contains only listed companies that have actuarial liabilities for pension plans with defined benefits. Most data used to be from the Amadeus database, excluding the value of shares and net liabilities for pension plans in the balance sheet and notes of the annual reports of each company.

For (Ohlson, 1995) and (Ashbaugh and Olsson, 2002), two of the main factors affecting the market value of the company are the shareholders' funds and net income. These indicators were therefore chosen as the two main independent variables in the model. Similarly, the net value of the actuarial liabilities, as defined in the financial statements as the net liability of pension plans, was used as a proxy to capture the influence of social responsibilities on the market value of the company. This is what occurs in Portugal, as the companies listed on the Stock Exchange Index were forced to outsource the operational and financial management of pension plans and long-term health care, by hiring independent institutions, such as pension fund management companies or life insurance companies authorized to underwrite pension funds. These institutions receive contributions, manage the portfolio of financial assets to cover the liabilities of the pension plans, and pay the corresponding benefits to the beneficiaries.

Based on the theoretical work of (Ohlson, 1995), and also on more empirical studies, such as (Collins, Maydrew and Weiss, 1997), (Hung and Subramanyam, 2007) and (Tsalavoutas et al., 2012), this study uses the following model with panel data:

$$Y_{it} = \alpha + X_{it}'\beta + \delta_i + \gamma_t + \varepsilon_{it}, \quad i = 1, \dots, N, t = 1, \dots, T, \quad \text{Eq. (1)}$$

Where  $Y_{it}$  is the dependent variable,  $X_{it}'$  is the  $k$ -vector of explanatory variables,  $\alpha$  is a scalar,  $\delta_i$  and  $\gamma_t$  represent cross-section and period specific effects (fixed or random), and  $\varepsilon_{it}$  is the error term for  $i^{\text{th}}$  cross-section and  $t^{\text{th}}$  time period.

The following comprises the vector of explanatory variables:

1.  $MC_{it}$  is the market value of a company  $i$  at the end of the financial period  $t$  under examination;

2.  $SF_{it}$  is the book value of net assets (i.e, shareholders'equity) of company  $i$  at the end of the financial period  $t$  under examination;
3.  $NI_{it}$  is the net profit after tax of company  $i$  for the end of the financial period  $t$  under examination; and
4.  $LP_{it}$  is the inverse of net pension liabilities of company  $i$  at the end of the financial period  $t$  under review.

In order to reduce heteroscedasticity, and to observe the elasticity of the change in market value, the set of variables mentioned above are nominal and in logarithm (L).

A pension fund is balanced when the net liabilities are zero, that is, when generically the value of financial assets accumulated in the pension fund is the perfect matching of the actuarial liabilities for pensions.

In building the proxy variable of net liabilities for pensions, as  $LP$ , which is the inverse of net liabilities, i.e,  $1 / (\text{net liabilities})$ , we intended to capture the effect of the increase in pension liabilities on the market value of companies in the short term. If the net liabilities are null, the ratio,  $1 / (\text{net liabilities})$ , tends to infinity, meaning that the effect on firm value is neutral, or positive in the limit when the value of the assets of the fund is higher than pension liabilities. If the value of net liabilities is high, then the value of the ratio tends to zero, meaning that the effect on firm value in the short term is negative, because it will increase companies' liabilities. In this case, when making the logarithm of the ratio,  $1 / (LLP)$ , the effect on the value of the company (that is on market capitalization) is negative.

In short, the net pension liability is equivalent to a contingent financial obligation. The smaller the value, the lower the negative impact will be on firm value. This ratio reflects the idea that an increase in  $LP$  reduces  $MC$ . The method of least squares panel data with fixed effects (intersection estimates), estimates the models to analyze the degree of heterogeneity of firms. The approximation White cross-section is used as the coefficient of the covariance method. This method is robust to correlation and heteroscedasticity in cross-section (Baltagi, 2008).

As mentioned previously, it is common to perform a Hausman test to verify random effects against fixed effects when using panel data. In this case, the fixed effects model is more appropriate to interpret the data from the companies. The general model allows us to test hypotheses using the following specifications:

$$LMC_{it} = \beta_0 + \beta_1 LSF_{it} + \beta_2 D_{2005} + \beta_3 D_{2005} \times LSF_{it} + \beta_4 D_{2008} + \delta_i + e_{it}, \quad \text{Eq. (2)}$$

$$LMC_{it} = \lambda_0 + \lambda_1 LNI_{it} + \lambda_2 D_{2005} + \lambda_3 D_{2005} \times LNI_{it} + \lambda_5 D_{2008} + \delta_i + e_{it}, \quad \text{Eq. (3)}$$

$$LMC_{it} = \alpha_0 + \alpha_1 LLP_{it} + \alpha_2 D_{2005} + \alpha_3 D_{2005} \times LLP_{it} + \alpha_4 D_{2008} + \delta_i + e_{it}, \quad \text{Eq. (4)}$$

$$LMC_{it} = \rho_0 + \rho_1 LSF_{it} + \rho_2 LLP_{it} + \rho_3 D_{2005} + \rho_4 D_{2005} \times LLP_{it} + \rho_5 D_{2008} + \delta_i + e_{it}, \quad \text{Eq. (5)}$$

Where, the variables are defined as mentioned above.

$LMC_{it}$  is the logarithm of the market capitalization for firm  $i$  at time  $t$ , and, the independent variables,  $LSF_{it}$  is the logarithm of shareholders' funds,  $LNI_{it}$  is the logarithm of net income and  $LLP_{it}$  is the logarithm of the inverse liability pension.

Two dummy variables are included,  $D_{2005}$  and  $D_{2008}$ , to respectively capture the transition to IAS, and the effect of the financial crisis in 2008. When the dummy variable  $D_{2005}$  is equal to 1, it refers to IFRS from 2005 onwards and when it's 0, it refers to the Portuguese standards.

The residual equity valuation is not considered, in order to avoid forecasting procedures related to the cost of capital, dividends and growth rate of future periods, or complex computation, such as the method proposed by (Beynon and Clatworthy, 2012). A single model with the explanatory variables, shareholders' equity and net income at the same time, is not conclusive in explaining the market value of the company due to collinearity issues that typically arise when using both variables together, as reported by (Olhson, 1995) and (Ashbaugh, 2002). To overcome this disadvantage, shareholders' equity and net income are included in a separate specification model (1), and (2), respectively. Thus, it can be seen that either one or the other individual influences, positively or negatively, the market value of the company.

This method allows us to observe whether the coefficients of shareholders' equity and net income in the separate equations for the periods of 2005 and beyond, differ from those obtained for 2004, and whether this difference is statistically significant.

#### Hypothesis 1

To test the first hypothesis, the unique and positive impact of the adoption of IFRS on the market value of Portuguese companies in 2005, a dummy variable is used to take into account the effects of the implementation of these standards in 2005 and subsequent periods. This hypothesis is tested using valuation models based on book value and earnings capitalization. Thus, the question of whether or not there is a change of the potential value of the company is tested. For this purpose, the coefficient of the dummy variable, and its sign, indicate the average change in the market price of the shares between the two periods.

#### Hypothesis 2

The second hypothesis tested is the finding that there was an impact on the market value of companies caused by the stock market crash of 2008. For this purpose, a variable dummy  $D_{2008}$  is introduced. This dummy variable takes the value 1 for the 2008 crash and 0 for the remaining years. This hypothesis is important since the crash of stocks influences the actuarial value of the liabilities and financial assets which are calculated through the fair value method.

#### Hypothesis 3

Finally, the third hypothesis is tested, by using LLP, as the proxy variable for net liabilities with pensions, to capture the negative effect of the transition to IAS 19 on the market value of companies with defined benefit pension plans and the negative perception of investors. The specification (Eq. 5) adds the combined, previously-defined, the effect of shareholders' capital and net liabilities. Taking into account the above assumptions, the interaction effects have been studied in various ways. First, in Eq. 2 through  $LSF * D_{2005}$ , which corresponds to the value of shareholder equity analysis for firm  $i$ , at the end of the financial period,  $t$ , multiplied by the dummy variable,  $D_{2005}$ , that consider the change of the set of all IAS in the period.

Second, in Eq. 3 through  $LNI * D_{2005}$ , which is the net result of firm  $i$  in the period, after taxes at the end of the financial period  $t$ , multiplied by the dummy variable,  $D_{2005}$ , which represents the set of accounting standards IAS.

Third, in Eq.4 and Eq. 5 through  $LLP * D_{2005}$ , which is the logarithm of the inverse net pension liability of firm  $i$  at the end of the financial period  $t$ , multiplied by the dummy variable,  $D_{2005}$ , which represents the isolated effect due to IAS 19 in the period.

Although the results are not presented here, any structural change between the periods from 2004 to 2010 was studied. Different specifications of the previous models were used, with the introduction of dummy variables for the periods of different years between 2004 and 2010.

The first step was to carry out previous tests to verify the existence of multicollinearity, as well as the residual correlation outliers, before testing the fixed effects. White Cross section specification is used to control the residual correlation. Other previous tests were also performed to validate the results. To test the joint significance of all effects as well as the joint significance of the effects of cross-section ( $H_0 : \delta_1 = \delta_2 = \Lambda = \delta_N = 0$ ) and the period effects ( $H_0 : \gamma_1 = \gamma_2 = \Lambda = \lambda_T = 0$ ) separately, a F-test using residual sums of squares and a ratio of likelihood Chi-square were performed.

#### 4.0 RESULTS AND DISCUSSION

The results of correlations between variables are shown in Table 1. This table shows that the explanatory variables of shareholders' equity and net income are highly correlated, which can mean a high degree of multicollinearity between them.

Table 1: Pairwise correlations between market capitalisation (MC), shareholders' funds (SF), net income (NI) and liability pension proxy (LP)

Correlation Probability Observations	Market capitalization MC	Shareholder funds SF	Net income NI	Pension Liabilities proxy LP
Market capitalization MC	1.000000 -			
	69			
Shareholder funds SF	0.712370 0.0000	1.000000 -		
	69	69		
Net income NI	0.841406 0.0000	0.825839 0.0000	1.000000 -	
	69	69	69	
Pension Liabilities proxy LP	-0.108521 0.3748	-0.091502 0.4546	-0.091881 0.4527	1.000000 -
	69	69	69	69

In this case, the estimators obtained by the method of least squares for panel data, have large variances and covariances, which make the accuracy of the estimations very difficult.

As a practical consequence, not only do some of the regression coefficients tend to not be statistically significant, but they may also have a wrong signal. To overcome this drawback, there are two solutions. One is to remove the variables most correlated, the other is to estimate panel models by the least squares method, separately for each of the collinear variables. As a general model does not have numerous explanatory variables, it is preferable to use different sub-models, as explained in the previous section.

A logarithmic transformation as traditionally carried out by authors such as Guerrero *et al.* (2012) reduces the skewness of the variables. Models 1 to 4 respectively correspond to the specifications (2) to (5), presented in the previous section. The estimated results are shown in Table 2.

As shown in table 2, for all models, the adjusted correlation coefficient  $R^2$  is high ( $> 0.9$ ). The p-value associated with the F test of the cross-section and the values of chi-square statistics strongly reject the null hypothesis, that there are no effects of cross-section, which validates the existence of specific effects of the company on all models. The impact of the adoption of IFRS in the set of listed companies

is assessed using the models mentioned above. Therefore, to test whether the transition rules promoted the increase in value of companies, a dummy variable is used ( $D_{2005}$ ). From the model (2) and (3), the sign of this variable is positive, but not statistically significant. In the model (4), when considering the shareholders' equity, the impact of the transition in terms of market capitalization is negative and significant at the 5% level (-0.83).

Table 2: Panel least squares model estimates. Dependent variable:  $LMC_{it}$

Independent variables	Model 1	Model 2	Model 3	Model 4
Constant	13.35* (4.91)	20.15* (17.71)	20.66* (61.70)	11.84* (4.23)
$LSF_{it}$	0.57* (3.47)			0.71* (3.12)
$LNI_{it}$		0.09 (0.87)		
$LLP_{it}$			-0.04*** (-1.99)	-0.02 (0.52)
$D_{2005}$	0.45 (1.39)	0.38 (0.84)	0.41 (1.30)	-0.83** (-2.06)
$D_{2005} \times LSF_{it}$	-0.02 (-0.62)			
$D_{2005} \times LNI_{it}$		-0.004 (-0.15)		
$D_{2005} \times LLP_{it}$			-0.01 (-0.61)	-0.05** (-2.25)
$D_{2008}$	-0.44* (-5.51)	-0.46* (-5.46)	-0.41* (-5.15)	-0.35* (-4.62)
Sample	2004-2010	2004-2010	2004-2010	2004-2010
Cross-sections	15	15	12	12
Unbalanced observations	91	91	74	68
$R^2$	0.932	0.922	0.937	0.958
Adjusted $R^2$	0.915	0.903	0.921	0.945
Jarque-Bera (Residual test)	2.119 [0.35]	1.040 [0.59]	3.449 [0.18]	2.699 [0.25]
LR fixed effects test	19.98	19.94	49.52	19.23
Cross-section F	[0.00]	[0.00]	[0.00]	[0.00]
	144.34	144.19	173.24	112.51
Cross-section Chi-sq.	[0.00]	[0.00]	[0.00]	[0.00]

Notes: t-statistic values are in parenthesis; Probability values are in brackets. \*, \*\* and \*\*\* indicates significant at 1%, 5% and 10% level, respectively

In model 1 for the global panel of 15 companies, the log of shareholders' equity has a positive and significant impact on the log of market capitalization before 2005. In this period, when the capital increase by 1 percentage point, the impact (elasticity) was 0.57 percentage points in market capitalization. When the  $D_{2005}$  variable is considered, the coefficient ( $D_{2005} \times LSF_{it}$ ) shows the interaction effect of the introduction of IFRS with shareholders' equity. After 2005, the effect tends to be lower by 0.02 percentage points, but it is not statistically significant.

In model 2, the elasticity of net income, before 2005, is also positive (0.09), but the interaction effect is negative (-0.004), thus the total effect is 0.086, lower than the elasticity of shareholders' equity in the model (1). However, it is not statistically significant in explaining the variation percentage of market capitalization. When independent variables are considered in the separated models (2) and (3), the results show that the interaction coefficient dummy  $D_{2005}$  variable in each model is negative, but not significant. When jointly considering shareholders' equity and net liabilities as explanatory variables in the model (4), without the presence of variable net income that is highly correlated with shareholders' equity, the interaction coefficient ( $D_{2005} \times LLP$ ) is negative and significant. This result indicates that the adoption of IFRS / IAS standards, particularly IAS 19, shows a slightly negative impact on the market value of listed companies with defined benefit pension plans. Next, considering the possibility that the



crash of 2008 affected the value of companies, it appears that, in all models, that the  $D_{2008}$  coefficient is negative and statistically significant as expected, although the impact of IFRS, as measured by the variable  $D_{2005}$ , is not conclusive in models (2) and (3), as seen in the previous paragraph.

The third hypothesis on the impact of the introduction of IAS 19 on the market value of the companies that sponsor defined benefit pension plans is studied through the models (3) and (4). In model (3), for the panel of companies with defined benefit plans, the impact is significant and negative (-0.04) as expected, although the interaction coefficient with the variable  $D_{2005}$ , is negative but not significant ( $-0.05 = -0.04 - 0.01$ ). Model (4) validates the previous result, as the coefficient of net liabilities with defined benefit pension is negative (-0.02) and the coefficient of the interaction with the variable  $D_{2005}$  is also negative (-0.05), which means an overall effect of -0.07 ( $= -0.02 - 0.05$ ) on the market capitalization of companies. As the classical theory argues (Ohlson, 1995), the market value of listed companies reflects major net assets and performance. A portion of the net income is usually converted into dividends, the other part is incorporated annually in shareholders' equity, at least in the form of legal reserves and other reserves. When net income is not distributed, it can increase the financial position of companies. The issue is similar for net liabilities with defined benefit pension plans, as, according to the fundamental equation of equilibrium accounting, pension liabilities may only increase as a result of a sustained increase in employee benefits, or as a result of a fall in interest rates, which means that the company needs to have additional resources to cope with these increased actuarial liabilities.

As noted in Table 1, net actuarial liabilities with defined benefit pension plans, is the explanatory variable least correlated with other variables, as it is normally funded by a separate fund and its value generally represents the difference between the value of financial assets and the actuarial value of the liabilities of the fund, not yet covered by the company. The results do not confirm the evidence that the introduction of IAS only had a negative impact on the market value of all non-financial Portuguese companies listed on the Stock Exchange in the period 2004-2010. When using the sample of companies listed on Euronext Lisbon, the impact of the implementation of these standards is positive, but not significant. We cannot conclude that there are similar results to studies such as those by (Hung and Subramanyam, 2007), who find only positive effects in the value of shareholders' equity and net income in Germany. When the sample is only restricted to companies that own defined benefit pension plans, externalized into pension fund companies, the impact of standards, particularly IAS 19, is negative and statistically significant, when the explanatory variable shareholders' funds and net liabilities pensions are included together.

In model 1 for the global panel, the impact of shareholders' equity on the market value of the company after 2005 is positive, but the coefficient of interaction, resulting from the adoption of international accounting standards, shows a slight reduction. However, by observing the coefficients of these variables, it can be concluded that the impact was 0.55 percentage points in the capitalization of the companies when there is an increase of 1 percentage point in shareholders' equity in the period, thus confirming the positive effect found by others (Hung and Subramanyam, 2007; Liu et al., 2011).

In model 2 the coefficient of the log of the net income is also positive (0.09) although the effect of the interaction with the dummy,  $D_{2005}$ , is negative (-0.004). Thus, the overall effect on the dependent variable is 0.086, albeit not statistically significant. A similar impact is found in other empirical studies of a sample of European countries (Gueifão, 2007) and for a set of Chinese companies (Liu et al., 2011). These results contrast with those obtained by (Perramon and Amat, 2006) and (Lopes and Viana, 2008), who found a negative effect on net income. Different results are observed when the explanatory variables are jointly introduced into the models. It cannot be forgotten that, when taking into account the distribution of dividends, there is always a relationship between net income from previous years and the value of shareholders' equity, as a portion of the net income goes to the company's reserves. However, there is evidence that the elasticity of capital on the dependent variable is greater than the elasticity of net income. This results in a greater sensitivity to changes in shareholders' equity, than to variations in net income when the IAS / IFRS were implemented in Portugal.

In all models, the coefficient of the interaction of the explanatory variables with the variable D2005 is not statistically significant, except in the model that includes capital and net pension liabilities jointly. The adoption of IAS, observed through these variables, shows a likely positive impact on the stock market value of all firms, regardless of the existence of pension plans, a result similar to that of (Liu *et al.*, 2011). However, when looking at the model (4), using market capitalization of companies, shareholders' equity and net liabilities with pensions as explanatory variables, the impact of IFRS becomes negative and significant.

As mentioned earlier, the impact of IAS 19 on the value of firms is studied only for companies with pension plans outsourced to pension funds or related companies. It is observed that, in models 3) and 4), the coefficient of the variable logarithm of shareholders' equity has a small negative effect on the capitalization of companies [(model 3) (-0.05 = -0.04 - 0.01) (model 4) (-0.025 = -0.02 - 0.05)]. The interaction effect is negative in both models, but only statistically significant in Model 4. Investors assess the effect of pension funds on the market value of these companies, with a slightly negative behavior in the short term. Thus the adoption of IAS 19 negatively affected the market value of these companies, a similar result to that found by (Tsalavoutas *et al.*, 2012) for the Greek case.

These results contrast with those of (Lopes and Viana, 2008) and (Aisbitt, 2006), who conclude that the introduction of the standards had a significant (positive) impact on the market value of listed companies, respectively in Portugal and the UK. However, there is evidence that international accounting standards are linked to strong market volatility, as the variable that captures the effect of the crash (D2008) is significant and negative in the market capitalization of companies in all models used in this study. In 2008, the method of fair value of the assets, which became mandatory in recognition of potential losses of the financial statements, leveraged the effect of that dummy variable. Fair value is the amount for which an asset could be traded or an obligation settled, knowingly and willingly, in normal market conditions. The application of the fair value method may explain this impact, since the variation in the value of assets exists, even if no actual transactions occur.

## 5.0 CONCLUSION

This article aims to contribute and enhance the existing literature on the adoption of IFRS in Portugal and adds information that enables a better understanding of financial reports of listed companies that have defined benefit pension plans. The analysis of the impact of IFRS on the value of non-financial companies listed on the Stock Exchange is relevant, to the extent that their financial reports reveal greater transparency and allow comparability of the companies' value in a globalized capital market, using the international accounting harmonization.

The results obtained in the empirical study, based on several models of panel data, do not confirm the evidence of the first hypothesis posed in this study, i.e. the unique and positive impact of the introduction of IFRS on the market value of non-financial Portuguese companies listed on the Stock Exchange during the period between 2004 and 2010. Whilst the introduction of IFRS does not have a unique impact, the stock market crash of 2008 shows a negative impact on the value of companies. As for the assumption that external events affect the value of companies on a larger scale, it can be concluded that the stock market crisis of 2008 had a negative impact on the market value of companies, based on the fair value criterion, as this is confirmed in all the models analysed. When only considering companies with defined benefit pension plans, the elasticity of firm value to equity is stronger than net income elasticity. Regarding the influence of IAS 19 on the value of companies with defined benefit pension plans, the results confirm that, in the case of Portugal, investors perceive as slightly negative the effect of net liabilities on the capitalization of companies listed on the Stock Exchange that have these social plans. It seems evident that the adoption of IAS 19 will tend to reduce the market value of a company in the short term.

However, given the low elasticity coefficient -0.07% of the variable of proxy pension liabilities ( $LLP_{it}$  - the inverse of log net liability pension, i.e.,  $\log(1/\text{net pension liabilities})$ ), this study gives evidence that the

international accounting standards for pension liabilities are currently not a strong negative force on the market value of companies, clearly on account of the increased transparency of disclosure of these liabilities which are outsourced to independent pension funds. Another finding is that the stock market crash affected the market values of companies significantly more, mainly on account of asset valuation measures imposed by the criterion of fair value, rather than by the rules of IFRS.

Finally, further research is needed to validate the hypotheses studied in both financial and non-financial firms of other European countries, in the short and long term. It will also be necessary to study further the effects of the accumulation of assets in a pension plan in the longer term, where the obligation for pensions is conceptualized as deferred compensation of employees. This effect may possibly leverage the results and the value of the company in the long term, as a result of a combination of better qualified human resources, together with organisational and operational synergies.

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