

A Work Project, presented as part of the requirements for the Award of a Masters Degree in Finance from the Faculdade de Economia da Universidade Nova de Lisboa.

The Value Relevance of Tangible Fixed Assets

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Abstract

The Value Relevance of Tangible Fixed Assets

This Work Project aims to verify whether gains from the revaluation of tangible fixed assets in Portugal and Spain are relevant to investors. My sample consists of Portuguese and Spanish listed firms and it spans from the mandatory adoption of IFRS in 2005 until 2009. The results suggest that gains from revaluations are relevant to investors in Portugal and Spain both individually and together and independently of the dependent variable used (March or December share prices). Also, further analysis suggests that revaluations have lower value relevance in firms with high levels of debt which implies an opportunistic motivation.

Key-words: Fair Value, Tangible Fixed Asset, Revaluation, Value Relevance.

Introduction

This work project aims to assess whether the gains from the revaluation of tangible fixed assets in Portugal and Spain have any impact on prices and, thus, value relevance for investors.¹ The motivation for this work project is to expand the current knowledge on the value relevance of the revaluation of non financial assets for investors under an International Accounting Standards Board (IASB) framework. This is relevant since there are several existing studies on the subject of the value relevance of financial assets but only a few when it comes to the value relevance of non financial assets. Additionally, this kind of study is important if we take into account that a new accounting system has come into existence in Portugal, the *Sistema Nacional de Contas* (SNC) which consists, for the most part, of a summary of the International Accounting Standards (IAS) rules and that applies to all companies except listed companies, banks and insurance companies.

This study focuses mainly on the predictive value side of relevance which allows for better forecasts of past and present events. However, this study can also be seen from a feedback value side of relevance, as it allows information users to “correct prior expectations”. Unfortunately, the timeliness characteristic will not be included in this study due to insufficient observations that would allow for the testing of this characteristic. In order to study this characteristic I need to use returns instead of prices and, also, current revaluations or, in other words, revaluations performed in the years studied, however, there are few observations which match this criteria and, therefore,

¹ I use property, plant and equipment and tangible fixed assets as synonyms throughout the text.

there are not enough observations to run a regression and get reliable results. This study also focuses on the reliability of fair value which according to Hermann *et al.* (2006) is more reliable than historical cost.

The empirical model used for testing value relevance is based on the model developed by Ohlson (1995) with a few changes to allow for testing of gains from revaluations.

It is essential to mention that this work project is just an initial study which increases the current knowledge on the value relevance of the revaluation, or, in other words, the use of fair value to measure non financial assets in European economies that use IAS and, more specifically, IAS 16 – Property, Plant and Equipment, and which has not been very thoroughly researched. This work project can be replicated for other economies or for the entire European Union, for example. Not only is it possible to extend this study to firm returns (Barth and Clinch, 1998; Aboody *et al.*, 1998; Easton *et al.*, 1993) but also to a cash flow analysis (Aboody *et al.*, 1998) or to an operating income analysis (Aboody *et al.*, 1998).

To test whether the gains from the revaluation of tangible fixed assets are relevant, I estimate the relation between gains from revaluations in Portuguese and Spanish firms from 2005 to 2009 and firm share prices at the end of the fiscal year. The tests are controlled for Equity (less gains from revaluations) and Net Income. The analysis is based on 814 hand collected firm year observations. As predicted, I find that gains from revaluations are value relevant to investors, however, they are actually negatively related with share prices. When I analyze the gains separately in each country, I find that, in reality, revaluations are negatively related with share prices in

Spain, which is probably due to the fact that several firms in the sample are cross-listed, and positively related in Portugal.

I also perform an analysis using debt-to-equity ratios, in order to assess if revaluations are performed for opportunistic reasons or to show a firm's true financial statements. I find that revaluations have a lower value relevance in firms with a high level of debt which implies an opportunistic motivation. This result is in line with previous research such as Easton *et al.* (1993) and Aboody *et al.* (1999).

This work project is divided into several parts: a literature review which includes a brief summary of the accounting method associated with the revaluation of non financial assets and a review on several papers on the subject; a sample analysis that explains which parameters were used to define the sample; a regression and descriptive statistics; an analysis on the results and some comments; an additional analysis using debt-to-equity ratios; and, finally, my conclusions.

Literature Review

IAS 16

As previously stated, this work project takes place in a European setting, which means that the firms used in the sample follow IASB and, more specifically, IAS 16, which is the accounting standard relevant for this research. The principal issues when one accounts for tangible fixed assets are “the recognition of assets, the determination of their carrying amounts, and the depreciation charges and impairment losses to be

recognised in relation to them” (IAS 16.1).² IAS 16 applies to property, plant and equipment when it is “probable that future economic benefits associated with the asset will flow to the entity” (IAS 16.7) and when its cost can be measured with a high degree of reliability and its main objective is to provide information relating to property, plant and equipment to the users of financial statements in a way that allows them to “discern information about an entity’s investment in its property, plant and equipment and the changes in such investment” (IAS 16.1).

“An item of property, plant and equipment that qualifies for recognition as an asset shall be measured at its cost” (IAS 16.15). This cost includes the asset’s purchasing price, costs directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended by management and the initial estimate of the costs of dismantling and removing the item and restoring the site on which it is located. The recognition of costs in a tangible fixed asset’s carrying amount ends when the item is in the location and condition necessary for it to be capable of operating in the manner intended by management. “The cost of an item of property, plant and equipment is the cash price equivalent at the recognition date. If payment is deferred beyond normal credit terms, the difference between the cash price equivalent and the total payment is recognised as interest over the period of credit unless such interest is capitalised in accordance with IAS 23” (IAS 16.23).³

A firm can choose between using the cost model or the revaluation model as its accounting policy for recognizing an asset’s cost. With the cost model “after recognition as an asset, an item of property, plant and equipment shall be carried at its cost less any

² Depreciation charges and impairment losses is an issue which is addressed in IAS 36 – Impairment of Assets.

³ IAS 23 – Borrowing Costs.

accumulated depreciation and any accumulated impairment losses” (IAS 16.30). With the revaluation model “after recognition as an asset, an item of property, plant and equipment whose fair value can be measured reliably shall be carried at a revalued amount, being its fair value at the date of the revaluation less any subsequent accumulated depreciation and subsequent accumulated impairment losses. Revaluations shall be made with sufficient regularity to ensure that the carrying amount does not differ materially from that which would be determined using fair value at the end of the reporting period” (IAS 16.31). The fair value of land and buildings is usually determined through market-based evidence by appraisal normally performed by professionally qualified valuers. The fair value of plants and equipments is usually their market value determined by appraisal. If a tangible fixed asset is rarely sold or of a specialised nature which leads to the inexistence of market-based evidence an entity may need to estimate fair value using an income or a depreciated replacement cost approach. When an item of property, plant and equipment is revalued, any accumulated depreciation at the date of the revaluation can either be restated proportionately with the change in the gross carrying amount of the asset so that the carrying amount of the asset after revaluation equals its revalued amount or, it can be eliminated against the gross carrying amount of the asset and the net amount restated to the revalued amount of the asset.

“If an asset’s carrying amount is increased as a result of a revaluation, the increase shall be recognised in other comprehensive income and accumulated in equity under the heading of revaluation surplus. However, the increase shall be recognised in profit or loss to the extent that it reverses a revaluation decrease of the same asset previously recognised in profit or loss” (IAS 16.39). If an asset’s carrying amount is

decreased as a result of a revaluation the process is exactly the opposite which means that the decrease is recognised in profit or loss, however, the decrease is also recognised in other comprehensive income when there is a sufficient balance in the revaluation surplus.

It is also important to mention that an entity shall apply this Standard for annual periods beginning on or after 1 January 2005 but earlier application is encouraged (IAS 16.81).

Related Research

This work project contributes to the research on the value relevance of fair value estimates of non-financial assets, especially of tangible fixed assets. Aboody *et al.* (1999) find that revaluations in the UK are positively associated with share prices and returns and that fixed asset revaluation amounts are not unreliable. They also find that revaluations are positively associated with future firm performance and that revaluations reflect, at least partly, changes in underlying asset values on a timely basis.

Barth and Clinch (1998) show that revaluations of tangible fixed assets in Australia are relevant to investors despite the fact that the value relevance seems to be stronger for plant and equipment than for property. They also demonstrate that revaluations which were done several years before are still value relevant to investors and that both upward and downward revaluations add value to investors as well.

Easton *et al.* (1993) came to the conclusion that book values which include asset revaluation reserves are more in line with the market value of firms than book values which exclude revaluations. However, they discovered that when it comes to an

earnings analysis, net increments of the asset revaluation reserves have a relatively low explanatory power except in special situations, such as when the change in the debt level is high or when the net increment to the revaluation reserve as a proportion of book value is relatively high. This research was also performed in Australia.

I also believe that it is important to make a brief literary review of the history and study of fair value, as well as the subject of relevance. According to Herrmann *et al.* (2006) and to the Statement of Financial Accounting Concepts (SFAC) n^o2 Qualitative Characteristics of Accounting Information, relevance is defined by three main characteristics: predictive value, feedback value and timeliness. Predictive value is the capacity of the information under analysis to provide better forecasts of past and present events. This is considered by many researchers as the most important characteristic and the one which has been subject to more studies as those mentioned earlier or even my own work project. Feedback value is the capacity of the information to allow users to “confirm or correct prior expectations”. At the time of the acquisition, fair value and historical cost are the same. However, as time goes by, fair value changes while historical cost does not, which means that fair value has “the potential to provide valuable feedback to users”. Finally, timeliness is the availability of information to a decision maker while it has capacity to influence decision making. This subject was studied in the papers by Aboody *et al.*, (1999) and Barth and Clinch (1998).

Herrmann *et al.* (2006) not only argue that fair value is more relevant to decision makers, but also that it is more reliable than historical costs. SFAC n^o2 defines reliability using three characteristics: verifiability, neutrality and representational faithfulness. Although verifiability favors historical cost, there are a few exceptions (self-constructed assets) in which it is not clear whether historical cost is more verifiable

than fair value. Neutrality and representational faithfulness favor fair value since historical cost violates the principle of neutrality because it “introduces a distinct conservative bias” and it does not provide representational faithfulness when “the market rate of depreciation (or appreciation) differs materially over time from the book rate of depreciation”.

Sample and Data Selection

The initial sample consists of 225 firms, 57 Portuguese and 168 Spanish. This includes all the listed companies in Portugal and Spain, from 2005 to 2009. This sample spans a 5-year period, which is big enough to perform a value relevance analysis. This time period is not more extended because IAS 16 only came into force on 1 January 2005 and, in order to have a consistent sample, I opted for not using information prior to this date.

However, this sample suffered some changes due to the following reasons: (a) I could not find any or part of the necessary information; (b) the accounting period of the firm does not end on December 31st; or, (c) the firm does not have consolidated financial statements. This resulted in the elimination of 37 firms, leading to a final sample of 188, 51 Portuguese and 137 Spanish. Noteworthy is also the fact that some firms do not have information for all the years from 2005 to 2009, either because (i) the firm only came into existence after 2005; (ii) the firm did not publish its 2009 Financial Statements in time to have the information added in this work project; or (iii) simply,

there was no information available for a given year.⁴ This led to a total of 828 observations, 226 concerning Portuguese firms and 602 concerning Spanish firms.

In order to remove any outliers in the sample I used a relatively common process, which is to remove all observations that are not in the interval constructed by the mean plus or minus three times the standard deviation. This results in the extraction of 14 observations which were considered outliers.

All the necessary accounting data was extracted from the firms' financial statements, hand-collected from the firms' websites or the corresponding regulatory body (CNMV in Spain and CMVM in Portugal). Share prices were extracted from Bloomberg.

Empirical Model

My goal is to discover if revaluations are value relevant to investors where value relevance refers to “a predicted association with equity market values” (Barth *et al.*, 2001). I use share price at the end of the fiscal year as a measure of relevant information to investors much like the researchers mentioned throughout my work project and because it has been shown by Sharpe and Walker (1975) that “announcements of asset revaluations were associated with substantial upward movements in stock prices, and that these shifts in stock prices were generally sustained in the post-announcement months”, that the market “digests this new information quickly” and, finally, that the movement in stock prices could not be entirely explained by earnings, dividend changes or induced changes in volatility. These conclusions are supported by other studies such

⁴ Only Annual Reports which have been published until 30 April 2009 are considered.

as the ones performed by Standish and Ung (1982) and Emanuel (1989). I chose the end of the fiscal year instead of three months after because the values for the remaining variables were taken from firms' annual reports at the end of the year and, therefore, share prices at the end of the fiscal year should reflect all that information (Barth and Clinch, 1999).

Following the theoretical model developed by Ohlson (1995), I estimate a cross sectional equation that relates revaluations to the share price at the end of the fiscal year:

$$P_{it} = \alpha_0 + \alpha_1 EqPS_{it} + \alpha_2 RevPS_{it} + \alpha_3 EPS_{it} + \varepsilon_{it} \quad (1)$$

where P is share price at the end of the fiscal year of firm i at year t . $EqPS$ is the book value of equity less the value of revaluation, $RevPS$ is the value of revaluation and EPS is earnings, all these variables are per share. α_0 and ε_{it} are included to capture the part of share price that is not explained by the dependent variables. This means that my main goal is to estimate the impact of revaluations on prices while $EqPS$ and EPS are held fixed. I predict that the coefficients of $EqPS$ and EPS in (1) are positive and statistically significant or, in other words, I predict that both variables are value relevant to investors while the coefficient of $RevPS$ is statistically significant but I cannot be sure if it is positive or negative. This is uncertain because I would expect this coefficient to be positive (Sharpe and Walker, 1975) but there are some firms which are cross-listed, especially in Spain, and according to Barth and Clinch (1996) this leads to a negative coefficient. I use Wald tests to test for coefficient equality between the coefficients for $EqPS$ and EPS in (1) in order to guarantee that these variables do not explain the same thing in the model.

This first analysis estimates the impact of revaluations on share prices in Portugal and Spain together, however, since they are different countries it is important to also estimate the impact of revaluations on share prices in Portugal and Spain separately. In order to do this I run equation (1) once again but only for the observations concerning Portugal and, afterwards, using only observations concerning Spain. I predict that the coefficients concerning the Portuguese *EqPS*, *RevPS* and *EPS* are positive and statistically significant and that the coefficients concerning the Spanish *EqPS* and *EPS* are statistically significant and positive and that the coefficient concerning *RevPS* is statistically significant but negative because in Spain there are four stock exchanges (Madrid, Barcelona, Valencia and Bilbao) and there are a lot of firms which are listed in more than one of these stock exchange or in other words, there are several firms which are cross-listed and, according to Barth and Clinch (1996), when there is cross-listing the coefficient concerning revaluations is negative. Once again I use Wald tests to test for coefficient equality between the coefficients for *EqPS* and *EPS* in Portugal and in Spain in order to guarantee that these variables do not explain the same thing in each model.

I will also perform a White test on all these models in order to assess if the residual variance of the variables in the regression models are constant (homoscedasticity) or not (heteroscedasticity). I believe it is important to mention that the presence of heteroscedasticity may result in the underestimation of the variance of the coefficients which can lead to the conclusion that a coefficient is statistically different from zero and therefore that the variable is statistically significant when in fact it is not. In order to prevent this I will use White's Heteroscedasticity-Consistent Standard Errors if the White test proves that there is heteroscedasticity in the models.

Descriptive Statistics

Table 1 presents descriptive statistics for the regression variables, both broken down by industry and aggregate. We can see that there is no clear dominance from any industry despite the fact that the Real Estate and Financial Services and the Basic Material / Industry / Construction industries have a higher representation and make up for almost half of the total sample, and that Oil and Energy and Technology and Telecommunications clearly have a lower representation in the sample and, together, represent only around 20% of the total number of observations.

It is important to mention that this industry classification is the one used by the Madrid Stock Exchange. Portugal and Spain have slightly different industry classifications. However, since Spain represents the majority of the observations, I decided to use the classification put forth by the biggest stock exchange in Spain which is the *Bolsa de Madrid*. The firms included in this stock exchange alone represent the majority of the sample.

The table shows that the mean (median) price is €12,10 (€6,05) but that, if we look at the mean (median) price of each industry, we can see that it spans from a low of €7,40 (€4,56) in the Technology and Telecommunications industry to a high of €17,99 (€15,10) in the Oil and Energy industry. We can also see that the mean *RevPS* is €0,50 although, when we look at it by industry, we realize that it spans from a low of almost zero (€0,05 in the Technology and Telecommunications industry) and a high of €1,18 in the Consumer Services industry. This mean represents 2,3% of the mean of the book value of equity per share excluding the revaluations per share. The median *RevPS* is zero, since many companies do not use the revaluation model. Another fact which is

made visible is that the mean (median) *EqPS* is €21,88 (€3,81) and that the mean (median) *EPS* is €1,77 (€0,40).

Table 1 – Descriptive Statistics for Dependent and Independent Variables

Industry		Price December	EqPS	RevPS	EPS
Basic Materials / Industry / Construction	Mean	13,40	15,73	,22	1,54
	Median	7,15	4,50	,00	,55
	Std. Deviation	17,195	49,231	,654	4,907
	% of Total N	23,1%	23,1%	23,1%	23,1%
Consumer Goods	Mean	8,98	5,42	,16	,40
	Median	7,20	3,49	,00	,29
	Std. Deviation	8,726	6,817	,357	1,015
	% of Total N	20,3%	20,3%	20,3%	20,3%
Consumer Services	Mean	9,23	3,34	1,18	,57
	Median	5,49	2,30	,00	,27
	Std. Deviation	10,727	6,187	4,592	1,308
	% of Total N	12,5%	12,5%	12,5%	12,5%
Oil and Energy	Mean	17,99	10,59	,23	1,48
	Median	15,10	6,11	,00	1,08
	Std. Deviation	15,905	11,938	,469	1,649
	% of Total N	9,5%	9,5%	9,5%	9,5%
Real Estate and Financial Services	Mean	14,58	62,55	,99	4,32
	Median	6,74	4,87	,00	,41
	Std. Deviation	33,123	392,869	10,051	26,407
	% of Total N	24,6%	24,6%	24,6%	24,6%
Technology and Telecommunications	Mean	7,40	2,52	,05	,52
	Median	4,56	2,06	,00	,17
	Std. Deviation	7,183	3,076	,172	,889
	% of Total N	10,1%	10,1%	10,1%	10,1%
Total	Mean	12,10	21,88	,50	1,77
	Median	6,95	3,81	,00	,40
	Std. Deviation	20,135	198,152	5,281	13,447
	% of Total N	100,0%	100,0%	100,0%	100,0%

Regression Results

Value Relevance of Revaluations in Portugal and Spain

Table 2 presents summary statistics from estimating equation (1), which relates gains from revaluations with share prices, for both Portugal and Spain. As predicted, revaluations are statistically significant when we control for earnings and book value of equity (t-statistic = -19,050).⁵ I could not predict whether revaluations were positively or negatively related with share prices, since there are several firms which are cross-listed. If we look at Table 2 we can see that revaluations are actually negatively related with share prices at the end of the fiscal year. I believe this to be the result of cross-listing, as some of the firms in the sample are listed in more than one stock exchange, which is in accordance with prior research. Also, as expected, the book value of equity and earnings are positively related with share prices and are statistically significant (t-statistics = 7,408 and 4,419).⁶

In Table 2 there is also a coefficient equality test, or Wald test, which tests for the equality between the coefficients concerning the book value of equity and earnings. Since the p-value of this test is below 1% I reject the null hypothesis that these coefficients are equal and, therefore, I conclude that investors distinguish between the book value of equity and earnings. This result was expected but it is still important to make sure that revaluations are not distorting investor expectations.

Table 2 also has a heteroscedasticity test, more specifically, a White test in order to check if the residual variance of the variables is constant or not. Since the p-values of

⁵ In this case and henceforth book value of equity corresponds to the book value of equity less the value of revaluations.

⁶ Appendix 1 presents summary statistics for the same regression using March share prices instead of December share prices and it supports these findings.

this test are below 1% I reject the null hypothesis that the residual variance is constant and therefore I run equation (1) again using Heteroscedasticity-Consistent Standard Errors (HCSE) and the results can be seen in Table 3. This table shows that all the variables are still statistically significant although *EPS* is only significant at a 10% level while *RevPS* and *EqPS* are statistically significant at a 1% level.

Table 2 – Regression Results for Portugal and Spain

Independent Variables	Prediction	Coefficient	t-Statistics		
Constant		10,773	23,658	0,000	***
EqPS	+	0,057	7,408	0,000	***
RevPS	?	-2,010	-19,050	0,000	***
EPS	+	0,521	4,419	0,000	***
N		814			
Adjusted R ²		0,576			
F Statistic		368,797	***		

Coefficient Equality Test Results (Wald Test)

Restriction	Chi-Square Statistics		
$\alpha_1 = \alpha_3$	13,721	0,000	***

Heteroscedasticity Test Results (White Test)

F-statistic	17,234	Prob. F(9,804)	0,000	***
Obs*R-squared	131,638	Prob. Chi-Square(9)	0,000	***
Scaled explained SS	677,022	Prob. Chi-Square(9)	0,000	***

*** Significant at a 0,01 level.

** Significant at a 0,05 level.

*Significant at a 0,10 level.

Notes: *P* is share price on December 31st. *EqPS* is equity less revaluations, per share. *RevPS* is the gains from revaluations per share. *EPS* is earnings per share.

Table 3 – Regression Results for Portugal and Spain using White’s HCSE

Independent Variables	Prediction	Coefficient	t-Statistics		
Constant		10,773	24,418	0,000	***
EqPS	+	0,057	3,292	0,001	***
RevPS	?	-2,010	-7,833	0,000	***
EPS	+	0,521	1,809	0,071	*
N		814			
Adjusted R ²		0,576			
F Statistic		368,797	***		

*** Significant at a 0,01 level.

** Significant at a 0,05 level.

*Significant at a 0,10 level.

Notes: *P* is share price on December 31st. *EqPS* is equity less revaluations, per share. *RevPS* is the gains from revaluations per share. *EPS* is earnings per share.

Value Relevance of Revaluations in Portugal

Table 4 presents summary statistics from estimating equation (1) for Portugal. As predicted, revaluations are statistically significant and positively related with price when we control for earnings and book value of equity (t-statistic = 4,240). Also, as expected, the book value of equity and earnings are positively related with share prices and are statistically significant (t-statistics = 8,723 and 4,653).

In Table 4 there is also a coefficient equality test, or Wald test, which tests for the equality between the coefficients concerning to the book value of equity and earnings. Since the p-value of this test is below 1% I reject the null hypothesis that these coefficients are equal and, therefore, I conclude that investors distinguish between the book value of equity and earnings. This result was expected but it is still important to make sure that revaluations are not distorting investor expectations.

Table 4 also has a heteroscedasticity test, more specifically, a White test in order to check if the residual variance of the variables is constant or not. Since the p-values of this test are below 1% I reject the null hypothesis that the residual variance is constant and therefore I run equation (1) again using Heteroscedasticity-Consistent Standard Errors (HCSE) and the results can be seen in Table 5. This table shows that all the variables are still statistically significant at a 1% significance level.

Table 4 – Regression Results for Portugal

Independent Variables	Prediction	Coefficient	t-Statistics		
Constant		2,950	14,522	0,000	***
EqPS	+	0,290	8,723	0,000	***
RevPS	+	0,199	4,240	0,000	***
EPS	+	0,203	4,653	0,000	***
N		225			
Adjusted R ²		0,433			
F Statistic		56,916	***		

Coefficient Equality Test Results (Wald Test)

Restriction	Chi-Square Statistics		
$\alpha_1 = \alpha_3$	38,870	0,000	***

Heteroscedasticity Test Results (White Test)

F-statistic	7,069	Prob. F(9,215)	0,000	***
Obs*R-squared	51,198	Prob. Chi-Square(9)	0,000	***
Scaled explained SS	54,082	Prob. Chi-Square(9)	0,000	***

*** Significant at a 0,01 level.

** Significant at a 0,05 level.

*Significant at a 0,10 level.

Notes: *P* is share price on December 31st. *EqPS* is equity less revaluations, per share. *RevPS* is the gains from revaluations per share. *EPS* is earnings per share.

Table 5 – Regression Results for Portugal using White’s HCSE

Independent Variables	Prediction	Coefficient	t-Statistics		
Constant		2,950	13,324	0,000	***
EqPS	+	0,290	4,172	0,000	***
RevPS	+	0,199	5,479	0,000	***
EPS	+	0,203	3,093	0,002	***
N		225			
Adjusted R ²		0,433			
F Statistic		56,916	***		

*** Significant at a 0,01 level.

** Significant at a 0,05 level.

*Significant at a 0,10 level.

Notes: *P* is share price on December 31st. *EqPS* is equity less revaluations, per share. *RevPS* is the gains from revaluations per share. *EPS* is earnings per share.

Value Relevance of Revaluations in Spain

Table 6 presents summary statistics from estimating equation (1) for Spain. As predicted, revaluations are statistically significant when we control for earnings and book value of equity (t-statistic = -19,430). I predicted that revaluations were negatively related with share prices, since there are several Spanish firms which are cross-listed and Table 4 confirms that prediction. Also, as expected, the book value of equity and earnings are positively related with share prices and are statistically significant (t-statistics = 3,531 and 7,163).

In Table 6 there is also a coefficient equality test, or Wald test, which tests for the equality between the coefficients concerning to the book value of equity and earnings. Since the p-value of this test is below 1% I reject the null hypothesis that these coefficients are equal and, therefore, I conclude that investors distinguish between the

book value of equity and earnings. This result was expected but it is still important to make sure that revaluations are not distorting investor expectations.

Table 6 – Regression Results for Spain

Independent Variables	Prediction	Coefficient	t-Statistics		
Constant		13,090	22,502	0,000	***
EqPS	+	0,032	3,531	0,000	***
RevPS	-	-2,450	-19,430	0,000	***
EPS	+	1,005	7,163	0,000	***
N		589			
Adjusted R ²		0,626			
F Statistic		329,023	***		

Coefficient Equality Test Results (Wald Test)

Restriction	Chi-Square Statistics		
$\alpha_1 = \alpha_3$	42,842	0,000	***

Heteroscedasticity Test Results (White Test)

F-statistic	18,739	Prob. F(9,579)	0,000	***
Obs*R-squared	132,912	Prob. Chi-Square(9)	0,000	***
Scaled explained SS	643,275	Prob. Chi-Square(9)	0,000	***

*** Significant at a 0,01 level.

** Significant at a 0,05 level.

*Significant at a 0,10 level.

Notes: *P* is share price on December 31st. *EqPS* is equity less revaluations, per share. *RevPS* is the gains from revaluations per share. *EPS* is earnings per share.

Table 6 also has a heteroscedasticity test, more specifically, a White test in order to check if the residual variance of the variables is constant or not. Since the p-values of this test are below 1% I reject the null hypothesis that the residual variance is constant and therefore I run equation (1) again using Heteroscedasticity-Consistent Standard Errors (HCSE) and the results can be seen in Table 7. This table shows that all the

variables are still statistically significant although *EqPS* and *EPS* are only significant at a 5% significance level.

Table 7 – Regression Results for Spain using White’s HCSE

Independent Variables	Prediction	Coefficient	t-Statistics		
Constant		13,091	22,556	0,000	***
EqPS	+	0,032	2,174	0,024	**
RevPS	-	-2,450	-19,111	0,000	***
EPS	+	1,005	2,277	0,023	**
N		589			
Adjusted R ²		0,626			
F Statistic		329,024	***		

*** Significant at a 0,01 level.

** Significant at a 0,05 level.

*Significant at a 0,10 level.

Notes: *P* is share price on December 31st. *EqPS* is equity less revaluations, per share. *RevPS* is the gains from revaluations per share. *EPS* is earnings per share.

Additional Analysis

According to Easton *et al.* (1993), there are two main reasons for the incidence of revaluations: the need or desire to present a “true and fair view” of a firm’s financial statements or to lower debt-to-equity ratios. Revaluations can be seen as opportunistic if a company has a high level of debt when compared to its equity because an upward revaluation leads to the creation of a revaluation reserve which increases the level of equity and, as a consequence, decreases the debt-to-equity ratio. Lower debt-to-equity ratios are important because they “loosen debt constraints and enhance financial flexibility” (Easton *et al.*, 1993). According to Aboody *et al.* (1999), “revaluations associated with debt-to-equity ratio motivations are less likely to reflect future performance than revaluations intended to reflect true and fair financial statements”.

This leads me to predict that the coefficient of revaluations related to the level of debt is negative in order to reflect the lower value relevance of revaluations in firms with high levels of debt.

In order to assess the relationship between the gains from revaluations and share prices while considering debt-to-equity ratios, I insert an interaction term in (1) which consists of the interaction between gains from revaluations and debt-to-equity ratios ($RevPS \times DE$). The debt-to-equity ratio is formed by dividing total liabilities by equity less the revaluation balance (Aboody *et al.*, 1999). Like in the previous analysis, I predict that the coefficients concerning $EqPS$ and EPS are statistically significant and positive, the coefficient concerning $RevPS$ is still undetermined for the same reasons as in previous analysis and, finally, I predict that the coefficient concerning the new interaction term, $RevPS \times DE$, is negative. However, share prices may not always benefit from the decrease in debt constraints which are not directly related with the association between revaluations and future performance, therefore, Aboody *et al.* (1999) did not predict the sign for the coefficient of the new variable.

$$P_{it} = \alpha_0 + \alpha_1 EqPS_{it} + \alpha_2 RevPS_{it} + \alpha_3 EPS_{it} + \alpha_4 RevPS \times DE + \varepsilon_{it} \quad (2)$$

The results for equation (2) are in table 8. As predicted, revaluations are still relevant (t-statistics = -8,356) but the coefficient is lower (in absolute terms), also, like in the initial analysis, revaluations are negatively related with share prices and, like before, this is due to the effect of cross-listing. As expected, earnings and the book value of equity are significant and positively related with share price (t-statistics = 4,833 and 7,415). Finally, the interaction term between revaluations and debt-to-equity ratios is significant and negatively related with share prices (t-statistics = -5,036), just as

predicted. I also performed Wald tests to assess whether the coefficients concerning *EqPS* and *EPS* are identical and for *RevPS* and *RevPSxDE* as well and in both cases the null hypothesis that these coefficients are identical is rejected.

Table 8 – Regression Results for Portugal and Spain with the coefficients for revaluation variables to differ depending on the debt-to-equity ratio

Independent Variables	Prediction	Coefficient	t-Statistics		
Constant		10,647	23,693	0,000	***
EqPS	+	0,057	7,415	0,000	***
RevPS	?	-1,371	-8,356	0,000	***
EPS	+	0,563	4,833	0,000	***
RevPSxDE	-	-0,039	-5,036	0,000	***
N		814			
Adjusted R ²		0,588			
F Statistic		291,259	***		

Coefficient Equality Test Results (Wald Test)

Restriction	Chi-Square Statistics		
$\alpha_1 = \alpha_3$	16,771	0,000	***
$\alpha_2 = \alpha_4$	61,247	0,000	***

*** Significant at a 0,01 level.

** Significant at a 0,05 level.

*Significant at a 0,10 level.

Notes: *P* is share price on December 31st. *EqPS* is equity less revaluations, per share. *RevPS* is the gains from revaluations per share. *EPS* is earnings per share. *RevPSxDE* is an interaction term between *RevPS* and *DE* which is the debt-to-equity ratio where equity is *EqPS*.

Conclusions

In this work project I test whether the gains from revaluations of tangible fixed assets in Portugal and Spain are value relevant to investors. Prior research focuses on the relation between asset revaluations and share prices and returns and, for the most part, it finds that asset revaluations are value relevant. Also, prior research focuses

mainly on firms in the UK and Australia. I consider share prices as a good measure of assessment of asset values and as a good summary measure of relevant information for investors.

Initially, I find that gains from revaluations in Portugal and Spain are significantly negatively related with share prices. In my initial equation I control for the book value of equity and for earnings. My findings provide strong evidence that gains from revaluations are relevant to investors.

However, as I develop my model, I find that, in truth, revaluations are only negatively related with share prices in Spain. In Portugal, revaluations are actually positively related with share prices which is what would be considered more common. However, and according to previous research, the fact that there is cross-listing in Spain may be the reason for this negative correlation.

Additionally, I further develop the initial model by adding an interaction term which allows me to test if the debt level of a firm, using debt-to-equity ratios, has an impact on the relevance of revaluations. Revaluations have a lower relevance in firms with a high level of debt, or a high debt-to-equity ratio which suggests that there is an opportunistic motivation behind these revaluations.

My work project provides input to the debate on the recognition of non financial assets and, in this case, tangible fixed assets, at fair value rather than at historical cost. The fact that it has consistently been found that fair value revaluations are statistically significant suggests that fair value is a reliable method of valuation and that tangible fixed asset revaluation amounts are not unreliable.

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Appendix

Appendix 1 – Regression Results for Portugal and Spain using March share prices

Independent Variables	Prediction	Coefficient	t-Statistics		
Constant		10,389	21,451	0,000	***
EqPS	+	0,310	2,309	0,021	**
RevPS	?	-0,711	-3,995	0,000	***
EPS	+	0,899	6,324	0,000	***
N		676			
Adjusted R ²		0,077			
F Statistic		19,850	***		

Coefficient Equality Test Results (Wald Test)

Restriction	Chi-Square Statistics		
$\alpha_1 = \alpha_3$	36,973	0,000	***

*** Significant at a 0,01 level.

** Significant at a 0,05 level.

*Significant at a 0,10 level.

Notes: *P* is share price on March 31st. *EqPS* is equity less revaluations, per share. *RevPS* is the gains from revaluations per share. *EPS* is earnings per share.