

Spanish Journal of Finance and Accounting / Revista Española de Financiación y Contabilidad



ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/refc20>

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To cite this article: José Antonio Cavero Rubio, Araceli Amorós Martínez & Antonio Collazo Mazón (2021) Economic effects of goodwill accounting practices: systematic amortisation versus impairment test, Spanish Journal of Finance and Accounting / Revista Española de Financiación y Contabilidad, 50:2, 224-245, DOI: [10.1080/02102412.2020.1778376](https://doi.org/10.1080/02102412.2020.1778376)

To link to this article: <https://doi.org/10.1080/02102412.2020.1778376>



Published online: 07 Sep 2020.



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ARTICLE



Economic effects of goodwill accounting practices: systematic amortisation versus impairment test

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ABSTRACT

Under IFRS, an impairment test is the only method applied to reduce goodwill. However, while the IASB have asked for comments about re-introducing the systematic amortisation method, European directives have already adopted its application. In this dual regulatory framework, we examine whether there are significant differences between the two methods that could affect the comparability of financial statements and their ability to faithfully represent the firm performance. Using a sample of 90 Spanish-listed firms over the period 2004–2011, the panel data technique and t-Student test confirm that under the impairment test, firms are likely to maintain higher amounts of goodwill and not recognise any impairment loss. Consequently, ROA and ROE are higher and leverage is lower. In addition, findings suggest that firms do not correctly implement this method to transmit private information about their economic situation. Results show that the better firm performance is the larger goodwill impairment will be.

ARTICLE HISTORY

Received 15 February 2019

Accepted 2 June 2020

KEYWORDS

Goodwill amortisation;
goodwill impairment;
financial ratios; IFRS;
business combinations;
effects of accounting
practices

JEL CLASSIFICATION

M41; M48

1. Introduction

Goodwill recognition and valuation is one of the subjects that has aroused most controversy in accounting literature, which is reflected in the continual flow of documents that try to regulate it. In addition, the speed with which these documents are substituted by others underlines its persistent regulatory instability and the difficulty of finding a satisfactory accounting practice.

This article focuses on the European context where since 2005 the International Financial Reporting Standards (IFRS) issued by International Accounting Standard Board (IASB) are mandatory for all firms listed on European stock markets to prepare consolidated financial statements (European Parliament & the Council, 2002). Since the approval of these standards, in particular, IFRS 3 *Business Combinations* and the International Accounting Standard 36 *Impairment of Assets* and 38 *Intangible Assets* (hereinafter, IFRS), goodwill accounting has changed. They mandated that goodwill should no longer be amortised (pre-IFRS method), but it should be tested for impairment at least annually (IFRS method). The application of this test was justified because it was considered less arbitrary and more opportune than considering a constant decrease of goodwill during useful life, which was also difficult to determine (IASB, 2004b).

Yet, after almost two decades of applying the impairment test, there are doubts about its application and some steps have already been taken towards using the amortisation method. Since the approval of Directive 2013/34/EU (European Parliament & the Council, 2013), all Member States should have re-introduced goodwill amortisation within a maximum of ten years into their local regulations by 20 July 2015. As Member States have adopted the corresponding modifications to comply with the Directive, a dual regulatory framework has been created. On the one hand, European-listed firms can just apply IFRS and therefore the goodwill impairment test. On the other hand, European non-listed firms can choose between IFRS and the local regulation of their member States. In this case, they apply a systematic amortisation plus an impairment when required. In the specific case of Spain, the corresponding modifications to comply with the Directive were adopted in the Law on Audit of Accounts 22/20 July 2015th (Head of State, 2015). Since 2016, Spanish non-listed firms that apply this local regulation have to amortise goodwill within ten years.

In the meantime, the IASB did not initially intend to revisit the idea of reintroducing the amortisation of goodwill and was working on ways to improve the impairment method. However, at the July 2018 meeting, the IASB decided to include a comprehensive analysis of goodwill accounting in its forthcoming discussion paper, which include a discussion on the possibility of re-introducing amortisation (IASB, 2018). As yet, this issue is still on their agenda, although their preliminary view is that it should not reintroduce the amortisation of goodwill (IASB, 2020).

Although there is an intensive academic interest in the consequences arising from the application of an impairment test, little research that compares it with the amortisation method. This comparison has now become more pertinent given the open discussions, the dual regulation and the increasing relevance of goodwill in financial statements during a period of economic recession.

This article expands existing research and inform the current debates by directly contrasting the two alternative methods – pre-IFRS (amortisation) method and IFRS (impairment) method. We use a sample of 90 Spanish listed firms for the period 2004 to 2011 (720 observations) and the panel data technique and the t-Student test. The aim is to ascertain if there are any significant differences that may affect the comparability of financial statements and their ability to faithfully represent firm performance.

The results confirm statistically significant differences between both methods that affect the amount recognised in goodwill numbers, the main financial ratios and the private information transmitted about the firms' economic situation. The identification of these differences is important for several reasons. On the one hand, standard-setting bodies will be able to assess the impact of these methods on the information transmitted in financial statements and a first step will be made towards assessing the possible cost-benefit. On the other one hand, if they are not identified, these differences could cause confusion for financial analysts and other users of financial statements.

They could distort the comparison between firms that apply IFRS and those that apply local regulations and the bases on which they support their decision-making. Consequently, by being aware of the differences between the two methods, they can be cancelled out and comparisons on which economic decisions are based would be more effective. Another point to consider is that results suggest that firms do not correctly implement the impairment test to transmit private information. We find that IFRS

treatment does not generate goodwill reductions that better represent firm performance. Thus, standard-setting bodies should reconsider the decisions that have already been made about this accounting item as well as those to be made in the future.

The rest of the article is organised as follows. The second section outlines literature related to this area. The third and fourth sections present the sample and the methodology. Section five and six illustrate the main results of our empirical analyses. Finally, the conclusions are presented in section seven.

2. Related literature

According to the IASB Framework, for information to be useful, it must be relevant and faithfully represent what it purports to represent, and this is enhanced if it is comparable, verifiable, timely and understandable. In this sense, some thought should be given to the economic effects caused by the application of different methods for the same economic item. We have to consider whether it is best to continue with a dual regulatory framework, apply one of these two methods or even consider other alternatives.

Before the adoption of IFRS, a series of studies have analysed the effects of the implementation of the different accounting practices. Most of them found differences in accounting figures and financial ratios as a result of the application of different practices (Larrán et al., 2000; Lee & Choi, 1992). Even in the year when IFRS were adopted, most of them found that the elimination of amortisation causes an increase in the amounts of goodwill and a decrease in goodwill impairments (Chalmers et al., 2011; Hamberg et al., 2011; Hung & Subramanyam, 2007). In addition, some authors state that discretion in firms' accounting choice for goodwill distorts the information presented and the comparability of financial statements (Amorós & Caveró, 2018; Callao et al., 2007; Navarro, 2004; Wines & Ferguson, 1993).

Other streams of research focus on different aspects of goodwill accounting as observed in the reviews by Boennen and Glaum (2014), Carvalho et al. (2016), D'Arcy and Tarca (2018), Schatt et al. (2016), and Wen and Moehrlé (2016). Most of them focus on the stock market to analyse the relevance and timeliness of goodwill and goodwill impairments (e.g. André et al., 2016; Bens et al., 2011; Magli et al., 2016; Shahwan & Roudaki, 2016). Others analyse the determinants of goodwill recognition, firms' ability to make predictions and the level of disclosure in the notes to financial statements (e.g. Amorós & Caveró, 2018; Giner & Pardo, 2015; Glaum et al., 2013). Nevertheless, there is no apparent consensus in the literature about the best option. Reviewed papers conclude with open questions and call for further empirical studies to assess the different goodwill accounting alternatives.

One reason for the lack of consensus among researchers is that a direct comparison between the two methods is limited. Boennen and Glaum (2014) point out as causes behind this that previously a direct comparison was problematic. They argue that formerly firms could apply the pooling of interests method and the immediately write-off goodwill against reserves. They also point out that most research papers have not yet completed the rigorous review process of academic journals and their evidence is still unpublished, which may still be happening. Hence, further investigation into the impact of applying the impairment test in contrast to the amortisation is needed.

To contribute to the literature and to enrich the ongoing debate, we directly compare the systematic amortisation method (pre-IFRS method) and the impairment test method (IFRS method) after the approval of IFRS. We specifically analyse the impact of these methods on the comparability of financial statements and whether they provide a better faithful representation.

A priori, as studies by Callao et al. (2007) and Navarro (2004) pointed out, we know there must be differences between both methods because their goodwill accounting criteria are clearly different. However, the quantitative impact will depend on the degree to which Spanish firms have adopted IFRS and on the users' ability to appropriately identify and understand the differences between the two methods. In this sense, we test whether there are significant differences in accounting figures that could worsen users' comparisons if they do not take them into account. Thus, our first hypothesis is as follows:

Hypothesis 1. There are no significant differences in the financial statements prepared under the application of pre-IFRS (amortisation) method and IFRS (impairment) method.

Additionally, the IASB claimed that the impairment method could better reflect the underlying economic situation of a business (IASB, 2004a, 2004b). This is based on the notion that this method does not force firms to automatically write down goodwill. Only when certain events and circumstances related to their economic and business factors indicate that their value has decreased (Chalmers et al., 2011). In this sense, it is expected that if a firm's economic situation improves (worsens), the likelihood of recognising an impairment must decrease (increase). In contrast, under the amortisation method, the magnitude of amortisation loss would be the same even if circumstances indicated an improvement.

However, there are studies that suggest contrary results. Critics fear that management may delay necessary impairments of goodwill (Li & Sloan, 2017). Others, such as Giner and Pardo (2015), Verriest and Gaeremynck (2009), also pointed out that firms with a better performance are more likely to impair when they need to do so according to their results target. Certainly, the impairment method gives managers more room for discretion than applying systematic amortisation. Nevertheless, this discretion can either be exploited opportunistically because of a firm's private incentives (AbuGhazaleh et al., 2011; Francis et al., 1996; Giner & Pardo, 2015) or used to reflect economic reality and to signal private information (Bens et al., 2011; Hirschey & Richardson, 2002; Lee, 2011). Accordingly, it is unclear how goodwill impairment is associated with a firm's performance and whether the faithful representation of its economic reality is better than that provided through amortisation. This will depend on the rigour with which the impairment test is applied. Accordingly, we develop our second hypothesis as follow:

Hypothesis 2. The relationship between the reduction in the value of goodwill and the economic situation of the firm does not depend on whether the criterion applied is amortisation or impairment.

Finally, following Glaum et al. (2018) and Giner and Pardo (2015), particular time periods could have altered the inference of the variables on goodwill reduction. Therefore, and because our sample period includes years that pre-date (2004–2007) and follow the financial crisis (2008–2011), we examine whether the financial crisis altered the relations established in our second hypothesis.

It is worth mentioning that this study adds a new dimension to the analysis of the information transmitted by goodwill numbers. Unlike earlier studies, it focuses on the economic factors related to a firm's performance rather than manager incentives (AbuGhazaleh et al., 2011; Giner & Pardo, 2015; Ramanna & Watts, 2012; Verriest & Gaeremynck, 2009) or market perceptions (Giner & Pardo, 2007; Hamberg et al., 2011; Van Hulzen et al., 2011). This focus also means that the problems associated with the use of market values are avoided, as pointed out by authors such as Hamberg and Beisland (2014), Jarva (2009), Lee (2011), and Ramanna (2008).

3. Sample

3.1. Sample selection process

The sample includes all Spanish-listed firms that present their annual consolidated financial statements to the Spanish Stock Exchange Commission (Comisión Nacional del Mercado de Valores – Spanish acronym, CNMV). The article focuses on the Spanish setting for several reasons. First, relatively little evidence exists regarding the issues under discussion in the Spanish context and we seek to expand the literature to another institutional context. The Spanish context presents an unfavourable environment for the application of IFRS. Spain's accounting rules are mainly influenced by the French accounting system and European Union legislation, which differ substantially from IFRS (Ding et al., 2007). It is a country that follows Continental European law code, characterised as having debt-dominated capital markets with concentrated ownership and a taxation-driven national accounting system. In contrast to countries where professional practices orient accounting standards, local accounting rules in Spain have traditionally been a public issue with scant contributions from the private sector (Callao et al., 2007).

Additionally, following Hung and Subramanyam (2007) and Soderstrom and Sun (2007), we have also limited our study to Spanish-listed firms to ensure that all firms had chosen homogeneous accounting treatments in the past. Likewise, the adoption of IFRS varies internationally depending on the degree to which national regulators differ in allowing or requiring IFRS (Nobes, 2008). Thus, this choice guarantees greater homogeneity and eliminates any biases arising from using an international sample with different institutional environments. Finally, the findings of this study could be pertinent to other economies as results can be extrapolated to similar economic environments.

Our sample period starts in 2005 when IFRS became effective and ends in 2011. This time span may be considered a representative period because it is adequate for the analysis of the effects of IFRS on financial statements. It is, in fact, a period that covers an economic boom and an economic decline, which enriches this research, as it allows results to be divided into two different economic situations. Additionally, firms adopting IFRS provided restated accounting figures published under 2004 IFRS (presented as comparative figures) in their annual consolidated financial statement for 2005. Thus,

we have been able to gather the restated data for 2004, and we have also been able to cover a four-year period before and after the eruption of the economic crisis in 2008, and thereby control this economic factor.

Our initial population comprises 166 Spanish-listed firms. Following prior research (e.g. AbuGhazaleh et al., 2011; Francis et al., 1996), 41 firms belonging to finance institutions and insurance firms were excluded since their special characteristics and their financial reporting processes, as regulated sectors, differ from other sectors. Additionally, firms whose years are not available for the whole period, do not present data for the variables used in this study or their accounting data is incomplete or unreliable, were excluded. This process generated a final sample of 90 firms (720 observations): 151 observations that impair goodwill and 569 observations that do not impair goodwill.

Table 1 presents the distribution of the sample per sector, following the classification defined by the CNMV, for the total sample (720 observations) and for the partitioned sample consisting of those that impair goodwill (151 observations) and those that do not (569 observations). It shows that only a small proportion of the firms impair goodwill over the period analysed, only 151 observations out of 720 (20.97% of the sample). As shown in Table 1, the distribution of the sample by sectors is not uniform. The majority of the firms correspond to two sectors: 'basic materials, industry and construction' (30.00%) and 'consumer goods' (22.22%). The 'technology and telecommunications' sector has the lowest number of observations, at 7.78%. For the distribution per sector of the firms that impair goodwill and those that do not, the observations are concentrated in those two sectors, which is similar to the total sample. Nearly half of the observations in both sub-samples are concentrated in the 'basic materials, industry and construction'

Table 1. Distribution of the sample per sector.

Sector	Goodwill impairment observations (% of sample)		No goodwill impairment observations (% of sample)		Total sample (% of sample)	
Petroleum and energy	17	11.26%	71	12.48%	88	12.22%
Basic materials, industry and construction	44	29.14%	172	30.23%	216	30.00%
Consumer goods	34	22.52%	126	22.14%	160	22.22%
Consumer services	30	19.87%	98	17.22%	128	17.78%
Real estate services	14	9.27%	58	10.19%	72	10.00%
Technology and telecommunications	12	7.95%	44	7.73%	56	7.78%
Total	151	100.00%	569	100.00%	720	100.00%

Table 2. Number of observations with goodwill impairment and no goodwill impairment per year.

Year	Goodwill impairment observations		No goodwill impairment observations	
	Observations	%	Observations	%
2004	18	20,00%	72	80,00%
2005	15	16,67%	75	83,33%
2006	15	16,67%	75	83,33%
2007	20	22,22%	70	77,78%
2008	19	21,11%	71	78,89%
2009	16	17,78%	74	82,22%
2010	20	22,22%	70	77,78%
2011	28	31,11%	62	68,89%
Total	151	20,97%	569	79,03%

and ‘consumer goods’ sectors, while for ‘technology and telecommunications’ fewer than 8% of the observations can be found in both sub-samples.

For a better understanding of the selected sample, [Table 2](#) provides information about the number and proportion of firms that impair goodwill per year. The highest number of firms that impair goodwill is 28 in 2011 (31.11% of the total sample), which is very slightly higher than in the rest of the years. It is also worth mentioning that, although the economic crisis started in 2008, [Table 2](#) shows a slight increase in the number of firms that impair in the previous year, reaching 20 firms (22.22% of the sample). Then, it goes down and there is no further increase until 2010 where only 20 firms recognised an impairment (22.22% of the sample). These results are in line with previous research by the European Financial Reporting Advisory Group (EFRAG, 2016) or Giner and Pardo (2015), for example. Also, like previous authors (Carlin & Finch, 2010; Ji, 2013; Li et al., 2011), the results show a delay in the recognition of impairment loss, although it seems that some firms were able to anticipate it.

3.2. Economic characteristics of the sample

[Table 3](#) reports the economic characteristics for the total sample and for the partitioned samples based on ‘goodwill impairment’ and ‘no goodwill impairment’ observations for the 2004–2011 period. [Table 3](#) specifically reports the mean, standard deviation, median, 25th percentile and 75th percentile of the following variables: goodwill (GW) and goodwill impairment (GWI) both deflated by total assets; the ratio goodwill impairment to goodwill (GWI/GW); total assets (TA); equity (EQUITY); sales (SALES); earnings (EARN); return on assets (ROA) calculated as earnings before interest and taxation (EBIT) divided by total assets; return on equity (ROE) calculated as net income divided by equity; leverage (LEV) calculated as total liabilities divided by total assets; and goodwill amortisation period, usually applied by each firm before the adoption of IFRS, expressed in years (GWAP). To control for noise effect due to outliers in the dataset, the values of goodwill accounting figures and key financial ratios are winsorised at the 1.5% level. The outliers, which according to economic reality, can distort the results of the analysis are eliminated (see McLeay & Trigueiros, 2002).

For ‘goodwill impairment’ observations, the mean value of GW is 0.1307, and the mean values of GWI and GWI/GW are 0.0167 and 0.1806, respectively. Surprisingly, the mean value of GW for ‘no goodwill impairment’ observations is lower (0.0716), even though goodwill is not impaired. Moreover, the maximum value and the standard deviation of GW in ‘goodwill impairment’ are 0.1787 and 0.0478 higher, respectively, than ‘no goodwill impairment’. Nevertheless, the mean values for EQUITY, SALES and EARN are 0.0159, 0.0361 and 0.0422 lower, respectively, meanwhile TA is 729,473.56 higher. Regarding the main financial ratios, the results are mixed. The mean values in ROA is 0.0052 lower, while ROE and LEV are 0.0119 and 0.0174 higher, respectively.

It should be noted that for the total sample, the values for the variables are more similar to the ‘no goodwill impairment’ observations. Additionally, the percentiles and median values of GWI and GWI/GW are zero, suggesting that after the approval of IFRS, most firms do not impair or only impair goodwill slightly. Nevertheless, for the total sample and for the partitioned samples, the average amortisation period applied by firms

Table 3. Economic characteristics of the sample.

Variable ^a	Mean	Q1	Median	Q3	Min.	Max.	Std. dev.
Goodwill impairment observations (n = 147)							
GW	0.1307	0.0159	0.0739	0.2158	0.0000	0.7766	0.1472
GWI	0.0167	0.0002	0.0015	0.0165	0.0000	0.3549	0.0431
GWI/GW	0.1806	0.0034	0.0316	0.1762	0.0000	1.0000	0.3001
TA ¹	6,564,268.39	550,231.50	1,740,822.00	6,815,981.00	19,715.00	67,646,040.00	12,299,515.33
EQUITY	0.3329	0.2135	0.3305	0.4609	-0.6137	0.8055	0.1799
SALES	0.6164	0.3398	0.6332	0.8266	0.0331	2.0007	0.3772
EARN	0.0186	-0.0057	0.0405	0.0853	-0.9129	0.3422	0.1379
ROA	0.0480	0.0170	0.0469	0.0858	-0.0736	0.1459	0.0491
ROE	0.1212	0.0453	0.1322	0.1975	-0.2183	0.3655	0.1168
LEV	0.6606	0.5367	0.6684	0.7824	0.1945	0.9931	0.1622
GWAP	15.6905	12.5000	20.0000	20.0000	4.5000	20.0000	5.5697
No goodwill impairment observations (n = 566)							
GW	0.0716	0.0018	0.0304	0.1047	0.0000	0.5979	0.0994
GWI	-	-	-	-	-	-	-
GWI/GW	-	-	-	-	-	-	-
TA ¹	5,834,794.83	252,266.25	741,071.00	2,853,547.00	17,866.00	104,040,580.00	15,767,280.02
EQUITY	0.3488	0.2221	0.3487	0.4721	-0.7219	0.8286	0.1912
SALES	0.6525	0.3742	0.6228	0.9124	0.0020	2.5035	0.3963
EARN	0.0628	0.0192	0.0496	0.0825	-0.3593	4.9741	0.2294
ROA	0.0532	0.0242	0.0509	0.0791	-0.0776	0.1781	0.0482
ROE	0.1093	0.0319	0.1093	0.1801	-0.2323	0.4475	0.1227
LEV	0.6432	0.5249	0.6502	0.7749	0.1714	1.1227	0.1743
GWAP	15.9249	10.0000	20.0000	20.0000	4.5000	20.0000	5.2787
Total sample (n = 713)							
GW	0.0838	0.0043	0.0351	0.1184	0.0000	0.7766	0.1134
GWI	0.0034	0.0000	0.0000	0.0000	0.0000	0.3549	0.0206
GWI/GW	0.0375	0.0000	0.0000	0.0000	0.0000	1.0000	0.1545
TA ¹	5,985,191.20	281,864.00	893,331.00	3,363,715.00	17,866.00	104,040,580.00	15,112,486.36
EQUITY	0.3455	0.2205	0.3423	0.4689	-0.7219	0.8286	0.1889
SALES	0.6451	0.3702	0.6228	0.8868	0.0020	2.5035	0.3925
EARN	0.0537	0.0148	0.0479	0.0834	-0.9129	4.9741	0.2145
ROA	0.0522	0.0226	0.0496	0.0805	-0.0776	0.1781	0.0484
ROE	0.1121	0.0349	0.1130	0.1860	-0.2323	0.4475	0.1216
LEV	0.6474	0.5304	0.6547	0.7770	0.1714	1.1227	0.1719
GWAP	15.8766	10.0000	20.0000	20.0000	4.5000	20.0000	5.3368

^aVariables definitions for firm *i* at year *t*: GW = goodwill deflated by total assets. GWI = goodwill impairment deflated by total assets. GWI/GW = goodwill impairment/goodwill. TA = total assets. EQUITY = Equity deflated by total assets. SALES = sales deflated by total assets. EARN = Earnings deflated by total assets. ROA = Earnings Before Interest and Taxation (EBIT)/total assets. ROE = net incomes/equity. LEV = total liabilities/total assets. GWAP = goodwill amortisation period, usually applied before the adoption of IFRS, expressed in years.

¹Thousands of euros.

is around 16 years (median period is 20 years in all cases), suggesting that firms that usually apply the maximum period, allowed a reduction in goodwill.

4. Methodology

To test hypothesis 1, we have used parametric tests (t-Student test) to compare the two datasets of values for goodwill accounting figures and key financial ratios according to whether they have been reported under the pre-IFRS or IFRS method. We specifically analyse the value of goodwill (GW), goodwill reduction (GWR) (goodwill amortisation or impairment losses according to the method applied) both deflated by total assets, and goodwill reduction intensity (GWRI) (the proportion of goodwill reduction over goodwill). Likewise, three ratios related to firms' financial performance are included. Primarily, because they are the main financial ratios used by financial analysts and other users for making decisions, and they are widely used in empirical literature (Callao et al., 2007; Larrán et al., 2000; Navarro, 2004). Thus, the analysis includes the ROA and ROE ratios as indicators of firms' profitability, and the LEV ratio as risk indicator.

The above variables are collected for two datasets of counterpart variables for the same firms and period, but under the two different goodwill accounting methods (related samples). The first dataset is hand-collected from the consolidated financial statements presented during 2005 to 2011, including restated data for 2004 provided under the impairment test (IFRS method). The second dataset corresponds to the values of the same data recalculated as if the firm had continued to apply systematic amortisation (pre-IFRS method) during the same period. This generates two datasets of 720 observations in each one (90 firms per 8 years). The contrast of these two datasets for the same economic period allows us to isolate any macroeconomic effects across the pre-IFRS period and the IFRS period, and examine the effects attributed exclusively to either of the two goodwill methods.

To recalculate the data, the amortisation tables have been reconstructed, taking the goodwill amounts and the amortisation coefficients applied up to 2004 as a reference. To do this, we obtained the necessary information from the consolidated notes presented by firms from 1998 to 2004, since during this time, after the Securities Market Law 37/1998 (Head of State, 1998), the amortisation period was extended to a maximum of 20 years. On the other hand, since the recognition of goodwill impairments during the pre-IFRS period was very unusual, we have not considered it in the reconstruction of the amortisation tables. Under the pre-IFRS method, there is no goodwill impairment, so we replace goodwill impairment loss with the recalculated goodwill amortisation from profit and loss accounts. The amount of book goodwill recognised in balance sheets is also replaced with the recalculated amount of book goodwill that would be recognised if firms had continued to apply a systematic amortisation. Table 4, Panel A shows the variables used and the adjustment applied.

Regarding the hypothesis 2, using again the two datasets of counterpart variables (720 observations in each one), we ran the following regression model to examine the relationship between the reduction in the value of goodwill and the economic situation of the firm:

Table 4. Variables analysed.

Panel A: Univariate analysis				
Variables	Abbreviation		Definitions ¹	
Goodwill	GW	Under IFRS method Goodwill deflated by total assets	Under pre-IFRS method ² Goodwill deflated by total assets both adjusted for the amortisation method	
Goodwill reduction	GWR	Goodwill impairment deflated by total assets	Estimated goodwill amortisation deflated by total assets adjusted for the amortisation method	
Goodwill reduction intensity	GWRI	Goodwill impairment divided by goodwill	Estimated goodwill amortisation divided by goodwill adjusted for the amortisation method	
Return on assets	ROA	Earnings Before Interest and Taxation (EBIT) divided by total assets	Earnings Before Interest and Taxation (EBIT) divided by total assets both adjusted for the amortisation method	
Return on equity	ROE	Net incomes divided by equity	Net incomes divided by equity both adjusted for the amortisation method	
Leverage	LEV	Total liabilities divided by total assets	Total liabilities divided by total assets both adjusted for the amortisation method	
Panel B: Regression model (GWR: dependent variable)				
Independent variables	Abbreviation		Definitions ¹	Expected sign
Change in return on assets	ΔROA	Under IFRS method Change in Earnings Before Interest and Taxation (EBIT) divided by total assets over the year t	Under pre-IFRS method ² Change in Earnings Before Interest and Taxation (EBIT) divided by total assets both adjusted for the amortisation method over the year t	-
Opening goodwill	GWo	Opening amount of goodwill deflated by total assets	Opening amount of goodwill deflated by total assets both adjusted for the amortisation method	+
IFRS method	IFRS	One if the data observation corresponds to the IFRS method, and zero otherwise		±
Size	SIZE	Natural logarithm of total assets	Natural logarithm of total assets adjusted for the amortisation method	+
Auditor	AUDITOR	One if a Big 4 auditing firm, and zero otherwise		+
Profit	PROFIT	One if pre-goodwill-impairment operating income is positive, and zero otherwise	One if pre-goodwill-amortisation operating income is positive, and zero otherwise	±
Sector	SECTOR	One if the observation belongs to sector j, and zero otherwise.		±

¹The definitions of the variables correspond to the firm *i* at the year *t*.

²To obtain the variables under pre-IFRS method, we have made the corresponding adjustments to expenses in the profit and loss account and assets in the balance sheet. First, the impairment loss recorded by the firms in each profit and loss account for each year from 2004 to 2011 has been replaced by the amortisation loss reconstructed for each firm and year of the period. Second, the amount of book goodwill recognised in balance sheets has been replaced by the amount that would have been recorded in this concept if amortisation had continued to be applied during the period according to the reconstructed amortisation tables.

$$GWR_{it} = \alpha_0 + \alpha_1 \Delta ROA_{it} + \alpha_2 IFRS + \alpha_3 IFRS * \Delta ROA_{it} + \alpha_4 GWo_{it} + \alpha_5 IFRS * GWo_{it} + \alpha_6 SIZE_{it} + \alpha_7 AUDITOR_{it} + \alpha_8 PROFIT_{it} + \alpha_9 SECTOR_{it} + \varepsilon_{it}$$

In the equation, the dependent variable (GWR) captures the amount of the reduction in goodwill (amortisation or impairment) deflated by total assets. The independent variable of interest is the change in return on assets (ΔROA). Based on economic reasoning and following prior research (e.g. Francis et al., 1996; Hayn & Hughes, 2006; Su & Wells, 2015; Verriest & Gaeremynck, 2009), we have included this variable as an attribute of an accounting-based measure of performance that reflect the economic situation of the firm. ΔROA is calculated as the change in EBIT divided by total assets over the fiscal year. We

have selected the change in this variable because we expect a lower (higher) reduction in goodwill when firms are performing better (worse). Hence, this variable is predicted to be negatively associated with goodwill reduction (Chalmers et al., 2011; Hayn & Hughes, 2006).

Next, we have included a dichotomous (dummy) variable IFRS and its interaction with firm performance (IFRS* Δ ROA). The variable IFRS is an indicator variable that equals one if the data observation corresponds to IFRS method, and zero otherwise. As the objective is to examine whether the association between goodwill reduction and performance is stronger under IFRS method, the variable of interest is IFRS* Δ ROA. This variable captures the incremental contribution of the association between firm performance and goodwill accounting reduction under the IFRS method. If this association is stronger, this variable is predicted to be negatively associated with goodwill reduction.

We have also considered other explanatory variables in our regression model. Following AbuGhazaleh et al. (2011), Hamberg et al. (2011), and Zang (2008), we have included the size of goodwill (GWO), measured as the opening amount of goodwill deflated by total assets, since it suggests that the relative amount exposed to the impairment test, or amortisation, is greater. As the objective is to compare the two goodwill methods, we have also included its interaction with IFRS (IFRS*GWO) to analyse the incremental contribution of this variable to goodwill accounting reduction under the IFRS method. In this sense, both are predicted to be positively associated with goodwill reduction.

To control for other aspects that may influence the subsequent accounting treatment of an asset and hence, the amount of goodwill reduction, we have included the size of the firm (SIZE) as presented in many previous studies (e.g. Chalmers et al., 2011; Giner & Pardo, 2015; Zang, 2008). This variable is measured as the natural logarithm of total assets and it is also a proxy for informational efficiency. Following previous authors, the expected association is positive.

In addition, we have included three dummy variables which are also commonly used in empirical literature (e.g. Jarva, 2014; Kabir & Rahman, 2016; Lee & Yoon, 2012): auditor membership (AUDITOR), profits (PROFIT) and firm sector (SECTOR). AUDITOR, coded as one if the auditor is one of the Big 4 auditing firms and zero otherwise, captures the influence of the auditor membership to The Big 4 (PwC, Deloitte, KPMF and E&Y) on information efficiency. PROFIT, coded as one if pre-goodwill-reduction operating income is positive and zero otherwise, controls for firms with profits from those with losses. SECTOR, coded as one if the observation belongs to sector i ($i = 1$ to 6) and zero otherwise, controls for the sector effect. According to previous authors, for the auditor dummy variable the association predicted is positive, while for profit and sector the expected association can be positive or negative. Table 4, Panel B shows the variables used in the regression model, the adjustment applied and the expected sign.

To measure the intensity of association between the model's variables, Pearson's correlation analysis was carried out. According to Gujarati (2004), as shown in Table 5, there are not variables that could give rise to a multicollinearity problem because their correlation coefficient is lower than 0.7.

Table 5. Pearson correlation matrix.

	GWR	ΔROA	GWO	IFRS	IFRS*ΔROA	IFRS*GWO	SIZE	AUDITOR	PROFIT	SECTOR1	SECTOR2	SECTOR3	SECTOR4	SECTORS
ΔROA	-0.056													
GWO	0.067*	-0.037												
IFRS	-0.125**	0.023	0.482**											
IFRS*ΔROA	0.057*	0.671**	-0.131**	-0.149**										
IFRS*GWO	-0.056*	-0.024	0.698**	0.520**	-0.136**									
SIZE	-0.091**	0.048	0.024	0.000	0.028	0.032								
AUDITOR	-0.050	0.004	0.089**	0.000	0.021	0.085**	0.177**							
PROFIT	-0.158**	0.159**	0.064*	0.000	0.102**	0.074**	0.090**	0.058*						
SECTOR1	-0.064*	0.050	-0.081**	0.000	0.035	-0.068*	0.098**	-0.235**	0.104**					
SECTOR2	-0.036	0.022	0.004	0.000	0.009	0.012	0.051	0.125**	0.083**	-0.243**				
SECTOR3	-0.003	0.020	-0.036	0.000	0.015	-0.035	-0.105**	0.019	-0.031	-0.198**	-0.350**			
SECTOR4	0.123**	-0.038	0.166**	0.000	-0.033	0.119**	-0.050	0.026	0.010	-0.172**	-0.304**	-0.249**		
SECTOR5	-0.050	-0.065*	-0.143**	0.000	-0.039	-0.125**	-0.023	-0.088**	-0.148**	-0.124**	-0.218**	-0.178**	-0.155**	
SECTOR6	0.025	-0.011	0.092**	0.000	0.007	0.094**	0.054*	0.104**	-0.068*	-0.109**	-0.192**	-0.157**	-0.136**	-0.098**

**Significant at 1%; *Significant at 5%.

Table 6. Descriptive statistics and statistical tests results.

Year/Variable ^a	Reporting as if under pre-IFRS method			Reporting under IFRS method			Mean difference IFRS – pre-IFRS
	Mean	Median	Std. dev.	Mean	Median	Std. dev.	
2004 (n = 86)							
GW	0.0502	0.0181	0.0785	0.0503	0.0200	0.0743	0.0001
GWR	0.0046	0.0015	0.0075	0.0011	0.0000	0.0047	-0.0036***
GWRI	0.1091	0.0621	0.1835	0.0364	0.0000	0.1571	-0.0727**
ROA	0.0573	0.0528	0.0508	0.0622	0.0561	0.0484	0.0049***
ROE	0.1216	0.1044	0.1123	0.1252	0.1257	0.1117	0.0036***
LEV	0.6136	0.6217	0.1874	0.6066	0.6155	0.1747	-0.0070
2005 (n = 88)							
GW	0.0544	0.0168	0.0791	0.0601	0.0203	0.0853	0.0057**
GWR	0.0049	0.0024	0.0067	0.0004	0.0000	0.0036	-0.0045***
GWRI	0.1251	0.0650	0.1905	0.0126	0.0000	0.1078	-0.1124***
ROA	0.0571	0.0577	0.0488	0.0613	0.0596	0.0434	0.0042***
ROE	0.1255	0.1285	0.1053	0.1305	0.1385	0.0935	0.0051***
LEV	0.6219	0.6332	0.1773	0.6170	0.6197	0.1750	-0.0049***
2006 (n = 89)							
GW	0.0681	0.0212	0.0987	0.0775	0.0330	0.1061	0.0093***
GWR	0.0062	0.0024	0.0094	0.0002	0.0000	0.0011	-0.0060***
GWRI	0.1364	0.0702	0.1968	0.0187	0.0000	0.1145	-0.1177***
ROA	0.0535	0.0505	0.0413	0.0581	0.0516	0.0406	0.0047***
ROE	0.1313	0.1432	0.1202	0.1393	0.1443	0.1106	0.0079***
LEV	0.6486	0.6588	0.1685	0.6414	0.6505	0.1673	-0.0072***
2007 (n = 90)							
GW	0.0819	0.0310	0.1018	0.0913	0.0369	0.1121	0.0094***
GWR	0.0078	0.0036	0.0117	0.0017	0.0000	0.0060	-0.0061***
GWRI	0.1288	0.0731	0.1498	0.0371	0.0000	0.1619	-0.0917***
ROA	0.0542	0.0528	0.0457	0.0604	0.0574	0.0433	0.0062***
ROE	0.1101	0.1238	0.1167	0.1295	0.1425	0.0993	0.0194***
LEV	0.6461	0.6564	0.1626	0.6379	0.6479	0.1608	-0.0082***
2008 (n = 90)							
GW	0.0784	0.0372	0.1001	0.0905	0.0425	0.1149	0.0121***
GWR	0.0082	0.0036	0.0108	0.0033	0.0000	0.0140	-0.0048***
GWRI	0.1460	0.0834	0.1839	0.0509	0.0000	0.1871	-0.0952***
ROA	0.0491	0.0461	0.0495	0.0536	0.0506	0.0497	0.0044***
ROE	0.1024	0.0820	0.1470	0.1165	0.1005	0.1299	0.0141**
LEV	0.6868	0.7055	0.1796	0.6759	0.6962	0.1778	-0.0109***
2009 (n = 90)							
GW	0.0854	0.0389	0.1311	0.1037	0.0501	0.1433	0.0183***
GWR	0.0098	0.0041	0.0149	0.0039	0.0000	0.0312	-0.0059**
GWRI	0.1522	0.0807	0.1743	0.0100	0.0000	0.0404	-0.1422***
ROA	0.0296	0.0300	0.0589	0.0364	0.0358	0.0559	0.0068***
ROE	0.0493	0.0613	0.1583	0.0755	0.0714	0.1303	0.0262***
LEV	0.6850	0.6873	0.1738	0.6705	0.6677	0.1716	-0.0145***
2010 (n = 90)							
GW	0.0786	0.0362	0.1125	0.1014	0.0512	0.1291	0.0228***
GWR	0.0104	0.0043	0.0162	0.0046	0.0000	0.0139	-0.0058***
GWRI	0.1859	0.0849	0.2456	0.0517	0.0000	0.1790	-0.1342***
ROA	0.0312	0.0303	0.0566	0.0394	0.0400	0.0542	0.0082***
ROE	0.0709	0.0558	0.1451	0.0779	0.0586	0.1415	0.0070**
LEV	0.6760	0.6761	0.1842	0.6557	0.6670	0.1790	-0.0203***
2011 (n = 90)							
GW	0.0766	0.0345	0.1006	0.0976	0.0502	0.1175	0.0210***
GWR	0.0099	0.0036	0.0140	0.0081	0.0000	0.0228	-0.0019**
GWRI	0.1865	0.0808	0.2649	0.0782	0.0000	0.2065	-0.1082***
ROA	0.0361	0.0382	0.0451	0.0453	0.0443	0.0426	0.0092***
ROE	0.0794	0.0750	0.1596	0.0918	0.0875	0.1444	0.0125**
LEV	0.6898	0.7056	0.1664	0.6764	0.6881	0.1612	-0.0133**
Total sample (n = 713)							
GW	0.0717	0.0286	0.1021	0.0838	0.0351	0.1134	0.0121***
GWR	0.0077	0.0030	0.0120	0.0034	0.0000	0.0206	-0.0042***
GWRI	0.1454	0.0726	0.2007	0.0375	0.0000	0.1548	-0.1079***
ROA	0.0462	0.0452	0.0509	0.0522	0.0496	0.0484	0.0061***

(Continued)

5. Empirical results and discussion

5.1. Comparability of financial statements under pre-IFRS and IFRS methods

Table 6 show the mean, median and standard deviation values for the variables respectively for each year and for the total sample, calculated as if the pre-IFRS method was applied and under the IFRS method. To determine whether the differences between the two methods are significant, the last column presents the values corresponding to the differences for each variable and the t-Student test results. Starting from the null hypothesis that indicated that the two methods are similar, this hypothesis has been rejected by a level of significance lower than 0.01. However, exceptions are found in: GW and LEV for 2004 (not rejected), GWRI for 2004 (rejected at 0.05 level), GW for 2005 (rejected at 0.05 level), ROE for 2008, 2010 and 2011 (rejected at 0.05 level), GWR for 2009 and 2011 (rejected at 0.05 level), and LEV for 2011 (rejected at 0.05 level).

It is important to identify these differences since they are statistically significant, and they could make comparison difficult if users of financial statements are not aware of them. Table 6 shows that under the goodwill impairment method the mean amount of GW is statistically significantly higher, except in 2004 where the positive difference is not significant. The difference between IFRS and pre-IFRS, in this variable, increases until 2010, the year when it reached the highest difference, -0.0228 . Additionally, GWR and GWRI are statistically significantly lower in the whole period. The highest difference for GWR is registered in 2007 (-0.0061) and the lowest in 2011 (-0.0019), while the highest difference for GWRI is registered in 2009 (-0.1422) and the lowest in 2004 (-0.0727). These effects are also observed in the median values of these variables, which reach value zero when reporting under the IFRS method in the whole period. Again, these results reveal that the IFRS method allows firms to recognise higher amounts in goodwill and not to report any impairment loss.

In line with Navarro (2004), results show that for the whole period and also for the total sample, ROA and ROE are statistically significantly higher and LEV is lower, except in 2004, when its negative difference is not statistically significant. The highest differences in these variables are registered in 2009 for ROE (0.0262), 2010 for LEV (-0.0203) and 2011 for ROA (0.0092). In contrast, the lowest differences are registered in 2004 for ROE and LEV (0.0036 and -0.007 , respectively) and in 2005 for ROA (0.0042). These results on ratios suggest that the IFRS method generally allows firms to report better values for these ratios. This is not surprising since no reduction on goodwill must positively affect the values of these ratios. Nevertheless, in view of previous evidence obtained by authors such as Biancone (2012), Carlin and Finch (2011), and Guthrie and Pang (2013), this situation could be the result of an inappropriate application of the impairment test that

Table 6. (Continued).

ROE	0.1002	0.1032	0.1363	0.1121	0.1134	0.1222	0.0119***
LEV	0.6573	0.6703	0.1763	0.6474	0.6553	0.1726	-0.0098 ***

***Significant at 1%; **significant at 5%; *significant at 10%.

^aVariables definitions for firm i at year t : GW = goodwill deflated by total assets. GWR = goodwill reduction (amortisation or impairment) deflated by total assets. GWRI = goodwill reduction/goodwill. ROA = Earnings Before Interest and Taxation (EBIT)/total assets. ROE = net incomes/equity. LEV = total liabilities/total assets.

led firms to maintain greater magnitudes in goodwill and avoid the recognition of goodwill impairment.

From another part, in line with the results presented by Biancone (2012) for the Italian context and EFRAG (2016) in the European under the IFRS method, the amount of GW grows until 2007. It grows back in 2009 but decreases again in the following two years. Similar behaviour is observed in the data as if reporting under the pre-IFRS method. In contrast, the evolution of GWR and GWRI is not the same for the two groups. On the one hand, under the IFRS method, both variables decrease in the earlier years and then grow in the later years, coinciding with the year prior to the economic crisis and the following-years. The effect of the crisis is also noticed in the lower amounts in ROA and ROE and higher amounts in LEV in the years of the crisis. Nevertheless, most firms continue not to impair their goodwill since the median for GWR and GWRI is zero in the whole period and their standard deviation values increase considerably. These results suggest that the negative economic situation affects how firms value their goodwill. This is also consistent with the results obtained by EFRAG (2016), which showed that European firms recognised greater impairments when the performance of the financial market was negative, although only a few did so. On the other hand, under the pre-IFRS method, GWR and GWRI variables increase in the whole period, except GWR in the last year probably due to the lower values of goodwill registered. Meanwhile, the ratios ROA, ROE and LEV presents ups and downs during the whole period.

To sum up, authors such as Chalmers et al. (2011) and Jarva (2009) pointed out that impairment is more flexible since, regardless of their economic circumstances, firms would have been forced to recognise an amortisation loss under the pre-IFRS method. Nevertheless, the scarce number of firms that recognise an impairment might suggest that they are adopting over optimistic positions that lead them to make poor estimates. Or, in view of previous evidence, as obtained by authors such as Camodeca et al. (2013), Giner and Pardo (2015), Li et al. (2011), and Ramanna and Watts (2012), this scenario could be a result of an opportunistic behaviour to avoid or delay its recognition in order to reach profit and loss targets.

5.2. The association between goodwill reduction and firm performance under pre-IFRS and IFRS Methods

Given that the sample under study comprises a heterogeneous group of firms, a contrast of the equation proposed in hypothesis 2 was carried out using a multiple linear regression analysis with panel data. In the panel data model, two approaches (fixed effects and random effects) are considered according to the behaviour of individual and temporal effects α_i . The Hausman test was applied to decide which of the approaches best fitted the behaviour of the sample. The results of the test revealed the absence of random effects in the model analysed, concluding that the suitable model was fixed effects. We therefore used a fixed effects model for our study, introducing a dummy variable α_i for firm and year for the effects of unobservable heterogeneity from the specific characteristics of each firm and period.

As the Pearson correlation coefficients between variables do not exceed the rule of thumb level (0.70), and the Variance Inflation Factors (VIF) and condition indices (untabulated) for the independent variables are less than 4 and 2 respectively, we can

Table 7. Association between goodwill reduction and firm performance.

Independent variables	Total sample (2004–2011)
Intercept	0.007 (9.251)***
ΔROA	-0.001 (-1.852)**
IFRS	-0.002 (-4.330)***
IFRS*ΔROA	0.003 (3.555)***
IFRS*Gwo	-0.030 (-6.070)***
PROFIT	-0.003 (-4.424)***
Other control variables	Included
n	1,426
Adj. R ²	0.494

Corrected t-statistics are in parentheses.

***Significant at 1%; **significant at 5%; *significant at 10%.

Regression model: $GWR_{it} = \alpha_0 + \alpha_1 \Delta ROA_{it} + \alpha_2 IFRS_{it} + \alpha_3 IFRS_{it} \Delta ROA_{it} + \alpha_4 Gwo_{it} + \alpha_5 IFRS_{it} Gwo_{it} + \alpha_6 SIZE_{it} + \alpha_7 AUDITOR_{it} + \alpha_8 PROFIT_{it} + \alpha_9 SECTOR_{it} + \epsilon_{it}$

Where for firm *i* at year *t*: GWR = goodwill reduction (amortisation or impairment) deflated by total assets. ΔROA = change in return on assets over the year. IFRS = one if the data observation corresponds to the IFRS method, and zero otherwise. Gwo = opening amount of goodwill deflated by total assets. SIZE = natural logarithm of total assets. AUDITOR = one if a Big 4 auditing firm, and zero otherwise. PROFIT = one if pre-goodwill-reduction operating income is positive, and zero otherwise. SECTOR = one if the observation belongs to sector *j*, (*j* goes from 1 to 6), and zero otherwise.

assert that multicollinearity is unlikely to be an issue of concern (Kleinbaum et al., 1998; Menard, 2002; Pedhazur, 1997).

Table 7 reports the regression model results for the analysis of the association between goodwill reductions and the economic situation of the firm. The adjusted R² is 0.494; therefore, the model presents a goodness of reasonable adjustment for the data observed from the sample.

The primary coefficients of interest are those that correspond to ΔROA and IFRS*ΔROA, which capture the association of firm performance with goodwill reduction. The coefficient of ΔROA (α_1) captures the association of firm performance with goodwill amortisation. The sum of the two coefficients ΔROA and IFRS*ΔROA ($\alpha_1 + \alpha_3$) corresponds to the association of firm performance with goodwill impairment. As predicted, the result shows that the coefficient of ΔROA presents a negative and significant association with GWR ($\alpha_1 = -0.001$). In contrast, the coefficient IFRS*ΔROA presents a positive and significant association ($\alpha_1 + \alpha_3 = 0.002$).

Although the performance variable has a significant incremental explanatory power in explaining goodwill impairment loss under the IFRS method, this positive association does not suggest that the faithful representation of firm performance improves. Similar to the evidence presented by Verriest and Gaeremynck (2009), this result suggests that the

better (worse) firms perform, the larger (lower) the goodwill impairment loss will be, which might reflect opportunistic behaviours. Additionally, $IFRS*GWO$ is negatively and significantly associated with GWR (-0.030), suggesting that under the IFRS method the greater goodwill is, the lower goodwill impairment will be, although the relative amount of goodwill exposed to the impairment test is greater. IFRS is negatively and significantly associated with GWR (-0.002), which confirms the previous results we obtained in the mean test, since once again it shows that under IFRS goodwill impairment recognition is lower than amortisation. PROFIT is negatively and significantly associated with GWR (-0.003), indicating that firms with positive operating income reduce goodwill less. Finally, contrary to previous studies (e.g. Beatty & Weber, 2006; Giner & Pardo, 2015; Hamberg et al., 2011), the results of our regression do not show any association between GWR and the variables SIZE, AUDITOR and SECTOR, suggesting that the amount for these factors does not influence the amount of goodwill reduction recognised.

6. Further analysis

6.1. The association between goodwill reduction and firm performance under pre-IFRS and IFRS Methods before and during the financial crisis

Finally, we examine whether the financial crisis altered the relations in our previous regression. Following Giner and Pardo (2015), we partitioned our sample observations into two sub-samples. Those that correspond to the period before the economic crisis (2004–2007) and those that correspond to the crisis (2008–2011). We replicate our regression model for the two sub-samples and examine how the economic situation of the firm influences goodwill reductions before and during the financial crisis. The Table 8 report the results.

Explanatory power increases in these two models, adjusted R^2 goes to 0.474 in the pre-crisis period and 0.632 in the crisis period, thus the model properly fits our set of observations in both cases. During the crisis period, the findings confirm the positive and significant relation of GWR with $IFRS*\Delta ROA$ (0.004) and the negative and significant relations with IFRS (-0.002), $IFRS*GWO$ (-0.032), and PROFIT (-0.002). However, in the pre-crisis period, goodwill reduction is explained by IFRS (-0.002), $IFRS*GWO$ (-0.034), SECTOR3 (-0.008) and SECTOR6 (-0.006).

Therefore, only the results of the crisis period are driving the general results; firm performance is the main factor that explains goodwill impairment losses. Focusing on the objective of this study, the comparison of the two goodwill methods, the coefficient IFRS (-0.002 in both cases) again confirms that goodwill impairment losses is lower than amortisation regardless of the economic period. However, no association between GWR and ΔROA is evident either before or during the crisis. These findings allude to the arbitrariness of amortisation and its independence with respect to firm performance. Nevertheless, the impairment test does not improve the faithful representation of firm performance, results again show a negative association with the amount of goodwill, and a positive association (none before the crisis) with firm performance.

Table 8. Association between goodwill reduction and firm performance. Before and during the financial crisis.

Independent variables	Pre-crisis (2004–2007)	Crisis (2008–2011)
Intercept	0.001 (16.142)***	0.004 (5.419)***
Δ ROA		
IFRS	-0.002 (-3.967)***	-0.002 (-2.642)***
IFRS* Δ ROA		0.004 (3.571)***
IFRS*GWO	-0.034 (-6.669)***	-0.032 (-4.241)***
PROFIT		-0.002 (1.767)*
SECTOR3	-0.008 (-9.738)***	
SECTOR6	-0.006 (-5.549)***	
Other control variables	Included	
n	706	720
Adj. R ²	0.474	0.632

Corrected t-statistics are in parentheses.

***Significant at 1%; **significant at 5%; *significant at 10%.

Regression model: $GWR_{it} = \alpha_0 + \alpha_1\Delta ROA_{it} + \alpha_2IFRS + \alpha_3IFRS*\Delta ROA_{it} + \alpha_4GWO_{it} + \alpha_5IFRS*GWO_{it} + \alpha_6SIZE_{it} + \alpha_7AUDITOR_{it} + \alpha_8PROFIT_{it} + \alpha_9SECTOR_{it} + \epsilon_{it}$

Where for firm i at year t : GWR = goodwill reduction (amortisation or impairment) deflated by total assets. Δ ROA = change in return on assets over the year. IFRS = one if the data observation corresponds to the IFRS method, and zero otherwise. GWO = opening amount of goodwill deflated by total assets. SIZE = natural logarithm of total assets. AUDITOR = one if a Big 4 auditing firm, and zero otherwise. PROFIT = one if pre-goodwill-reduction operating income is positive, and zero otherwise. SECTOR = one if the observation belongs to sector j , (j goes from 1 to 6), and zero otherwise.

7. Conclusions

The empirical findings reveal that applying different goodwill accounting methods affects the information transmitted in financial statements. The IFRS method allows firms to maintain a higher amount of goodwill and to report large or no impairment losses. Likewise, the goodwill method applied affects the values of the main financial ratios analysed. In general, the reported values of ROA and ROE are higher, and LEV is lower, producing a favourable impact on the external image transmitted by firms.

The results of the regression model also reveal that, although the decisions about reducing goodwill are affected by firm performance in both methods, the IFRS method does not seem to transmit more faithful information. The impairment test method is more flexible and might better represent the economic reality of firms, as upheld by the IASB. Nevertheless, our findings suggest that firms do not correctly implement this method to reveal private information. Under IFRS, results show that a small number of firms recognise goodwill impairment losses (even when the economic climate worsens) and the better firm performance is, the larger goodwill impairment will be.

Based on these results, the current regulatory context that allows the coexistence of two goodwill accounting methods could create difficulties for the comparability and comprehension of financial statements. If one of the objectives of the IASB is to improve

comparability through the convergence of accounting practices, these differences must be taken into account. They could constitute competitive advantages for those firms that adopt a more liberal position (impairment method) compared to a more conservative position (amortisation method) if they are not identified. Comparisons could be adversely affected and the basis on which different users of financial statements support decision-making, with the risk that this will entail.

Consequently, and given how important goodwill values are for the different users of financial information, standard-setting bodies and other regulating bodies should be working together so as not to break the convergence objective on both international and national levels. Furthermore, the impairment test does not improve the faithful representation of firm performance, and this could be a consequence of the discretion afforded in its implementation process. Nevertheless, despite the problems presented in the impairment test, the solution is not the re-introduction of the amortisation method, widely criticised. There is more room to improve the impairment method and provide more useful information.

Hence, the standard-setting bodies should try to solve the problems underlying this method before once again adopting the amortisation method. In this sense, goodwill debates also should consider measures that demand greater transparency, higher levels of enforcement and the use of more appropriated assumptions. These measures could help to reduce subjectivity and opportunist behaviours, and increasing comprehension and usefulness of the valuations made about goodwill.

Finally, it is noted that this study is limited to Spanish-listed companies, which does not allow an examination of the influence of country factors (institutional and economic conditions) on the results obtained. Future research could include samples of companies from different countries. As well as this, it would be interesting to analyse other types of companies such as unlisted companies or small and medium sized companies, which are not compelled to adopt IFRS and could present other results.

Disclosure statement

No potential conflict of interest was reported by the authors.

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