DETERMINANTS OF GOODWILL IMPAIRMENT AND THE IMPACT OF THE NEW GOODWILL REGULATION ON FINANCIAL PERFORMANCE *

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Keywords: Goodwill impairment; IFRS 3; IAS 36; excessive optimism; DiD.

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Determinants of goodwill impairment and the impact of the new goodwill regulation on financial performance

Abstract

Using a database with all the Spanish non-financial firms with positive goodwill on balance, we test the determinants of goodwill impairment recognition before 2016, searching for evidence of opportunistic behaviour. Moreover, we test the impact of the change in regulation on accounting profits before amortisation through a differences-in-differences approach against a sample of 4,000 control firms. Both tests yield results in line with the interpretation that the systematic amortisation of goodwill paired with a periodic impairment test may lead to accounting that better reflects the underlying economics of goodwill. However, this is yet an ongoing research and results should not be taken as definitive.

Keywords: Goodwill impairment; IFRS 3; IAS 36; excessive optimism; DiD.

1. Introduction

The debate on goodwill amortisation vs. goodwill impairment has been ongoing over the last two decades. American SFAS 142 was the first to eliminate the systematic amortisation of goodwill, replacing it with periodic impairment tests. In the IFRS/IASB sphere, a similar decision was taken with IFRS 3 / IAS 36. In Spain, the 2008 accounting reform was aligned with IFRS 3, but since 2016 systematic amortisation of goodwill was again required, following the EU Directive 2013/34 for non-listed firms.

Most of the recent academic literature studies the introduction of impairment tests (e.g., EFRAG, 2016). However, the Spanish case allows for the analysis of the inverse transition. The motivation of this article is to analyse the new "turn-around" requiring again the systematic amortisation of goodwill. In particular, we contribute in two instances. First, we analyse the determinants of goodwill impairment recognition by the Spanish firms before 2016. Is there evidence that managers were acting opportunistically or being excessively optimistic? Second, we test the impact of the change in regulation on business performance. Is there evidence that firms with goodwill on their balances show better performance under one accounting method or another?

The structure of the article is as follows. In Section 2, the recent changes in the accounting for goodwill and prior academic research about it are reviewed, followed by the hypothesis development. Section 3 describes the research design for each hypothesis to be tested. In the fourth Section, data and sample selection are described. The empirical results are then discussed in Section 5 in two parts: the determinants of impairment before the recent change in regulation in Spain, and the impact of that change over financial performance of the Spanish firms. Section 6 provides a set of conclusions.

2. Hypothesis development

2.1 Regulation on goodwill impairment vs. goodwill amortisation

Accounting for goodwill, and for goodwill impairment and amortisation in particular, has been a controversial issue for decades. Both in the FASB and IASB environment there has been constant change of regulation, sharpening the debate. The first years of the 21st century saw the generalization of impairment tests based on the premise that goodwill does not systematically lose value over time (Carvalho et al., 2016). In 2001, SFAS 142 imposed a fair-value-based impairment test that eliminated a periodic amortisation and a recoverability-based impairment test that were in force before. Likewise, in 2004, IFRS 3

Business Combinations and related amended version of IAS 36 *Impairment of assets* were issued, regulating the implementation of impairment tests on assets, including goodwill.

In 2012 the IASB cast doubt upon the application of impairment tests and opened the door to a further revision of the regulation. Later, the Directive 2013/34 of the European Union set that goodwill will be systematically amortised by non-listed firms and by any firms that, voluntarily, do not adopt the IAS/IFRS. In Spain – where this study is focused - the 2008 reform of the General Accounting Plan applied goodwill impairment tests. However, since 2016, with the transposition of the European Directive, the systematic amortisation of goodwill linearly over 10 years (unless a different useful life is justified) is again required. The only exception applies to consolidated financial statements of firms that issued securities in an EU regulated secondary market (debt securities and equity instruments), which maintains the application of the IAS/IFRS, as well as for non-listed companies that voluntarily decide to use the IAS/IFRS in their consolidated annual accounts. The transition from impairment to amortisation regulations included a transitional provision that allows firms, only in 2016, to amortise goodwill against reserves on a straight-line basis over 10 years from the date of recognition of goodwill.

2.2 Extant research

The literature on the determinants of goodwill impairment focuses on any regulation that allows firms to recognize losses in their annual records due to asset impairments, to identify the corporate and environmental factors that lead to such recognition. Following Gunn et al. (2018), there are two competing views on how firms use this discretion. The first view posits that firms record impairments following a conservative reporting strategy. This is related to the literature on the conservative bias in behavioural finance.[1] The second view argues that firms use their discretion to report opportunistically by delaying the recording of bad news. Whether firms report conservatively or opportunistically depends on manager incentives and is likely to vary across business cycles (Ryan, 2006). Indeed, conservatism can be costly as it reduces earnings and book values, increases the likelihood of bankruptcy, and reduces the incentives towards acquisitions (Zhang, 2008; Francis and Martin, 2010). If these costs are relevant, firms may opt to act opportunistically by delaying the recording of impairment in hope of better news, or eventually performing a "big bath" charge. Some classic results follow. Lawrence et al. (2013) observe larger impairment when book-to-market ratios are greater than one, in line with the conservatism assumption. André et al.

[1] Defined as the slow updating of models in face of new evidence (Shleifer, 2000), conservatism explains why markets often respond gradually to new information (Chan et al., 1996). It results in earnings reflecting bad news more quickly than good news (Basu, 1997), and has been suggested to explain the profitability of momentum strategies (Chan et al., 1996) and the evidence of underreaction (Barberis et al., 1998).

(2015) find a reduced conditional conservatism after IFRS adoption, although this effect was lower in countries with high-quality auditing and strong enforcement regimes. Finally, conservatism is found to persist after events such as debt initiation, seasoned equity offerings, and covenant violations (Beatty et al., 2008; Kim et al., 2013; Tan, 2013).

Beyond that debate, the literature is extensive but inconclusive. Carvalho et al. (2016) provide a literature review from 2002 to 2015 and suggest an open field for future research on the determinants of goodwill disclosure. Indeed, research results often do not coincide, led by subjectivity in data collection, the use of different analysis periods, and samples in different jurisdictions. Furthermore, estimating fair values is a highly subjective process because these assets are generally not traded and are very illiquid (Gunn et al., 2018). Recent research seeks to provide further evidence about the role of corporate governance (Kabir and Rahman,2016), managerial efficiency (Li, 2016), institutional factors (Huikku et al., 2017; Cerqueira and Pereira, 2020), CEO incentives and monitoring (Glaum et al., 2018; Filip et al., 2021), auditor competencies (Stein, 2019), and ownership (Ahn et al., 2020) on impairment reporting.

The literature on the impact over corporate results is a catch-all for evidence of changes in regulation on goodwill recognition or impairment affecting some sectors or regions more than others, as well as a differential impact on financial statements, innovation, corporate social responsibility, and others. As with the literature on determinants of impairment, there is a debate on the positive and negative effects of impairment recognition. On the one hand, Li and Sloan (2017) find that the new GAAP standard (SFAS 142) resulted in relatively inflated goodwill balances and untimely impairment, and Filip et al. (2015) find that managerial manipulation to avoid impairment losses is detrimental to firms' future performance. Lev (2018) discusses this as an additional evidence of the deteriorating usefulness of financial report information. On the other hand, Cheng et al. (2018) find that managers will acquire more information to comply with SFAS 142, improving firms' internal information environment and leading to higher forecast accuracy, M&A quality, capital allocation efficiency, and performance.

Finally, other authors have focused on the impact of goodwill impairment over the cost of capital of firms (Mazzi et al., 2017), differences between US and European firms regarding impairment recognition (André et al., 2016), the identification and assessment of intangible assets arising from commercialization of innovations (Labunska et al., 2017), and how ethical are managerial decisions on goodwill impairment (Giner and Pardo, 2015).

2.3 Hypothesis development

Key to the literature on the determinants of goodwill impairment recognition is the debate between managerial conservatism and opportunistic behaviour. Hence, using different measures of reporting conservatism, we will test the next hypothesis thus formulated:

H1a: *Conservative reporting policies are associated with higher goodwill impairment.*

In addition, we pose two further hypotheses about potential opportunistic behaviour by managers that we might anticipate:

H1b: *Lower relative weights of goodwill compared to total assets are associated to higher goodwill impairment.*

H1c: *There is a positive impact over goodwill impairment associated to year 2015.*

On one hand, firms will recognise goodwill impairment more easily the more residual this asset is on their balance sheets. On the other hand, we predict a "big bath" effect just before 2016, when the new regulation imposing systematic amortisation would come into force. These managers would anticipate the regulatory change to smooth the effect of goodwill amortisation in future periods, while implicitly recognising the delayed impairment before.

Secondly, we aim to study the consequences of financial reporting on goodwill and impairment. Recent articles such as Li and Sloan (2017) and Cheng et al. (2018) analyse the introduction of impairment tests. We seek to analyse the opposite case: how going from impairment regulation (before 2016) to goodwill amortisation (after 2016) in Spain affected business performance. We pose the following hypothesis:

H2: *The ratio of earnings over assets of treatment firms decreased relative to control firms after the adoption of the amortisation method in year 2016.*

The hypothesis tests any potential impact of accounting discretion on profitability, measured as earnings scaled by assets. Thus formulated, the hypothesis poses a negative impact of the change in regulation to goodwill amortisation. To prevent biased results, in the numerator we will use earnings before depreciation, amortisation, impairment and losses, and in the denominator total assets will not include goodwill balances.

3. Research design

3.1 Determinants of impairment

To test hypotheses H1a, H1b and H1c on the determinants of impairment before the introduction of the amortisation method, we perform a panel data regression to incorporate

both the cross-section and over time impact of impairment decisions. The dependent variable is IMP_GW, the ratio of the goodwill impairment recognized in period *t* over the initial goodwill balance (the figure in the balance sheet at the end of year *t-1*).

Our test variables are different measures of conservatism, as well as the two measures devised to test for managerial opportunistic behaviour. Following Givoly and Hayn (2000), a measure of reporting conservatism is the extent to which earnings include negative non-operating accruals. Non-operating accruals are calculated as total accruals (net income plus depreciation minus operating cash flows) less operating accruals (those arising from the basic business of the firm, obtained in the cash flow statement as changes in inventories, accounts receivable and prepaid expenses less changes in accounts payable and taxes payable). This measure summarizes primarily loss and bad debt provisions, restructuring charges and impairment, and its timing or amount is subject to some managerial discretion. Based on this, we estimate two alternative measures of conservatism. CONSV is the ratio of earnings (measured as EBITDA) over non-operating accruals, winsorised at +100 and -100, and standardised across the sample to have zero mean and one standard deviation.[2] This proxy compares earnings with non-operating accruals, in such a way that the greater the ratio the more conservative the reporting strategy. A second proxy, CONSV2, multiplies non-operating accruals by -1 (in order to make the proxy increasing in accounting conservatism) and divides it over total assets. The proxy is winsorised and standardised likewise CONSV.

A third proxy for conservatism uses an alternative specification, following Gunn et al. (2018). CONSV_SKEW is calculated as the difference between the skewness of operating cash flows and the skewness of net income, standardized across the sample. Larger values imply greater conservatism because earnings will be negatively skewed relative to cash flows when bad news is recognized in earnings more quickly than good news. This proxy is constant throughout the sample; hence, fixed effects estimator is not useful, as it uses data variation over time. When the Hausman test suggests that random effects estimation is neither a valid alternative, we will use the HT estimation method by Hausman and Taylor (1981), which combines the fixed effects estimation with an instrumental variables (IV) estimation for the time-invariant regressors that are correlated with the individual effects.

Hypotheses H1b and H1c test the opportunistic behaviour of managers in two instances. GW_A is the ratio of the goodwill balance in period *t* over beginning-of-period total assets (i.e., its balance in year *t-1*). This measure accounts for the importance of goodwill in the balances of the treatment firms, with the interpretation that managers will be less reluctant

[2] Standardisation of conservatism measures eases the interpretation of results and allows for comparison of the resulting regression coefficients across each conservatism proxy.

to recognise the impairment if goodwill is marginal. Finally, we introduce annual dummies in the model to observe the relative impact of year 2015.

The list of control variables follows in order. Khan and Watts (2009) document two control variables associated with conditional conservatism by non-listed firms. On the one hand, firm size (SIZE) – calculated as the natural logarithm of total assets at the end of fiscal year – may be positively related to goodwill impairment if larger firms have a higher litigation demand for conservatism or negatively associated if they have less information asymmetry and a lower contracting demand for conservatism (Gunn et al., 2018). On the other hand, leverage (LEVER) – the ratio of the firm's debt to the book value of equity at the end of fiscal year – is presumed to have a negative impact: since leveraged firms assume more risk, they will be more reluctant to recognize additional losses.

Moreover, the effects of previous accounting decisions accumulate in the balance sheet and constrain managers opportunistic behaviour. Following Barton and Simko (2002), we include the net operating assets relative to sales (NOA), measured as shareholders' equity less cash and marketable securities plus total debt, over sales. We expect a positive relationship, since greater NOA reduces managers' ability to delay impairment. To control for performance, we introduce two variables. First, the return on assets (ROA), measured as the EBITDA over total assets. We expect a positive relationship with impairment, since better performing firms will be less reluctant to recognize an impairment loss. Second, the frequency of operating losses (LOSSFREQ) experienced by the firm, measured as the percentage of fiscal years in which the company has reported losses at the EBITDA level over the last three years (two years for 2012). Like ROA, one would expect that firms performing poorly will be more reluctant to recognize additional losses (implying a negative relationship), but if losses are frequent, they might take the opportunity to make a "big bath". Consequently, we don't pose an expected impact. Finally, we consider dummies for industry fixed effects (SCT) and listed firms (SM), to control for unobserved heterogeneity of industry and stock market shocks.

The empirical specification of the resulting model is:

$$IMP\_GW_{it} = \beta_0 + \delta\ CONSERVATISM_i + \gamma\ GW\_A_{it} + \theta_{12\text{-}14}\ yeard_t + \beta_x\ Z_{it} + \beta_s\ D_i + \mu_i + \varepsilon_{it} \quad (1)$$

where Z_{it} is a vector of regressors that follows the literature on the determinants of goodwill impairment, D_i is a vector of dummies for the sector and listed nature of the firms, subscript *it* refers to firm *i* at time *t*, and where coefficients δ for the proxy of conservatism used in the regression, γ for GW_A and θ for year dummies are the variables to be tested. Moreover, μ_i controls for the individual effects of an unobservable nature, and ε_{it} is a random error.

The list and expected impact of the control variables, according to the description above, is SIZE (+/-), LEVER (-), NOA (+), ROA (+), and LOSSFREQ (+/-).

3.2 The impact of changes in regulation on financial performance

The analysis of the effects of impairment recognition is complemented with the analysis of the financial performance by a set of both listed and unlisted firms. Hypothesis H2 is tested with a DiD approach that compares a treatment group of firms that report some goodwill in the sample period (a few years before and after the change in regulation) against a control group of firms that never reported goodwill during the same period – so they are unaffected by the change in regulation in year 2016. Since treatment firms have goodwill and control firms do not, they are likely to differ in firm characteristics such as treatment firms being larger and more diversified because they performed acquisitions. To control for the effect of these differences, we use firm fixed effects and a list of control variables that account for potential differences. The empirical specification is:

$$\text{DEPENDENT}_{it} = \gamma_0 + \gamma_2 T_t + \gamma_3 D_i T_t + \Sigma\, \beta_x\, \text{Control}_{it} + \mu_i + \epsilon_{it} \qquad (2)$$

where subscript *it* refers to firm *i* at time *t*. The dependent variable – return on assets, measured as EBITDA scaled by total assets less goodwill, denoted ROA2 – is compared in terms of a dummy variable D_i that takes value equal to 1 for firms with positive goodwill at some point in 2012-2019 and 0 otherwise, and in terms of a dummy variable T_t that takes values 0 before 2016 and 1 after the change in regulation. Moreover, μ_i controls for the individual effects of an unobservable nature, and ε_{it} is an error term. Because we include firm fixed effects, we do not consider the main effect of the treatment variable, $\gamma_1 D_i$. The coefficient of interest is γ_3, since post-2016 × treatment captures the incremental change in the dependent variable for treatment firms. Hence, a positive (negative) impact for H2 to be satisfied it is required that $\gamma_3 > 0$ (< 0), with $\gamma_3 > \gamma_2$ ($< \gamma_2$).

The list of control variables is in order. Firm profitability is affected by size, revenue growth, leverage, investment, and current assets (Asimakopoulos et al., 2009). Moreover, Yazdanfar (2013) recognizes the impact of lagged profitability and productivity. The expected impact for each control variable is as follows. Firm size (SIZE) is measured as the natural logarithm of total assets at the end of fiscal year. It is usually expected to have a positive impact on profitability: indeed, larger firms not only enjoy higher turnover but also have better access to capital markets and lower cost of borrowing (Asimakopoulos et al., 2009). However, it may also exhibit a negative relationship due to its expected negative association with revenue growth (Variyam and Kraybill, 1992). Sales growth (GROWTH) is calculated as the growth rate of revenues in two consecutive years. The classic view confirms a positive

association between profitability and business growth (e.g., Cowling 2004). However, this expected result must come with a nuance, since more recent studies show a rather limited influence (e.g., Delmar et al. 2013).

Leverage (LEVER2) is measured here as the ratio of the firm's long-term debt and debt in current liabilities over total assets. The impact depends on the theory one follows on the determinants of capital structure. Thus, the pecking-order theory predicts a positive relationship between solvency and leverage, improving expected profitability. However, a negative relationship is expected under an agency costs perspective (Harris and Raviv, 1990) because higher debt reduces the funds available for investment. Physical capital investment (INVEST) is calculated as the growth rate of fixed assets in two consecutive years. Over the long term, its expected impact on profitability is positive, since it expands production, aiming at improving sales, cash flows and profits. However, over the short term, the renewal of fixed assets, at equal sales, implies an apparent worsening of turnover because, as fixed assets age, their net book value decreases, as accumulated depreciation increases. Current assets (CURRENT), measured as current assets scaled by total assets, may also exhibit either a positive or negative relationship with profitability. If interpreted as investment (working capital), its expected impact would be positive under the same logic as INVEST. However, inefficient management of current assets would negatively impact on profitability.

Productivity is introduced in two ways: the ratio of sales to employees (PRODTY), with expected positive impact, and the ratio of operating costs (measured as revenues minus EBITDA over revenues, denoted as OPEXRAT), with expected negative impact. Finally, lagged profitability (ROA2 of year *t-1*) is introduced to account for potential inertia of corporate results over time. We do not consider to including macroeconomic factors that influence firm growth (Ipinnaiye et al., 2017) because we presume them to be similar for all Spanish firms. To sum up, the list and expected impact of the control variables, according to the description above, is SIZE (+/-), GROWTH (+), LEVER2 (+/-), INVEST (+/-), CURRENT (+/-), PRODTY (+), OPEXRAT (-) AND LROA2 (+).

4. Data and sample selection

4.1 Determinants of impairment

We start from the universe of individual financial statements by all companies but financial firms in Spain that had some positive goodwill in their balances at least one year in period 2012 to 2015, according to SABI database, resulting in 3,906 firms and 15,624 year-firm

observations. In period 2012 to 2015, no amortisation of goodwill was allowed and thus, calculating impairment was easy to perform. Impairment data was directly estimated from balance sheet information in the following cases. First, since IMP_GW is measured relative to goodwill balance in year t-1, when it was zero the impairment is assumed to be zero.

Second, when goodwill balance did not change in two consecutive years, the impairment is assumed to be zero. Third, impairment should be reported in the "impairment and losses" account in the income statement, together with any impairment and losses of any intangible assets, PP&E and investment property. Hence, whenever that account was equal to zero, we assume goodwill impairment to be zero as well. Fourth, whenever the change in goodwill balance over two consecutive years was identical to the "impairment and losses" reported in the final year, goodwill impairment was assumed to be that amount. In any other case, impairment figures need to be obtained from the notes to the financial statements, since only there they are reported separately from other assets. With information retrieved online or directly received from companies, we managed to complete 98% of the population. Finally, the small number of negative impairment obtained were removed – as they represent unique events and potential misclassifications in the data.

Table 1 provides descriptive statistics for the variables in our sample. Data is winsorised at the 1% and 99% for all continuous regressors except NOA and ROA, winsorised at 5% and 95%. There are 7,552 year-firm observations with impairment decisions, of which in more than 7,050 cases (93.8%) firms did not recognize any impairment loss. Although this in itself might be indicative of the reluctance of Spanish companies to declare impairment, the favourable economic context in Spain since the end of 2013 should be taken into account, probably positively influencing the expectations of estimated future cash flows.

Table 1. Descriptive statistics. Sample: listed and unlisted firms with goodwill, 2012-2015.

				Quantiles				
Variable	n	Mean	S.D.	Min	.25	Mdn	.75	Max
Imp_GW	7522	2.18	12.02	0.00	0.00	0.00	0.00	100.00
GW_A	14081	5.80	10.80	0.00	0.00	0.50	6.10	58.40
CONSV	13919	0.01	0.14	-0.90	-0.04	-0.01	0.10	0.91
CONSV2	13920	0.04	0.83	-2.87	-0.35	0.01	0.39	3.75
CONSV_SKEW	12290	0.00	0.96	-2.24	-0.68	-0.02	0.69	2.21
SIZE	13959	9.83	1.49	5.70	8.80	9.60	10.70	14.40
LEVER	12653	2.78	6.14	-30.70	0.60	1.50	3.30	61.60
NOA	13125	1.06	0.99	0.20	0.50	0.70	1.20	6.30
ROA	12786	6.99	6.34	-8.90	2.90	6.40	10.80	24.20
LOSSFREQ	15622	14.55	28.70	0.00	0.00	0.00	0.00	100.00

The mean (median) impairment is 2.18% (0.0%) of goodwill in balance, while the mean (median) goodwill in balance is 5.8% (0.5%) of total assets – almost half of the cases with no goodwill in balance that year. Leverage is quite low during the sample period (mean

6.1%, median 1.5%) and the positive economic environment is observed in positive ROAs (median 7.0% and at least three quarters of the sample with positive return) and loss frequency in the last three years being equal to zero in more than 75% of the cases. Pearson correlations between the dependent variable, test variables, and control variables are consistent with our predictions, with conservatism measures being positively related to IMP_GW, and GW_A – one of the proxies for opportunistic behaviour – being negatively related. Moreover, control variables LEVER and NOA have correlation signs consistent with our predictions, while only ROA shows the opposite sign expected. Nonetheless, correlations are quite low in all instances, due to the high number of null data for IMP_GW. Finally, it is worth mentioning the low correlation of the three measures of conservatism, proving to be ideal for a robustness analysis.

4.2 The impact of changes in regulation on financial performance

The sample for this study combines two databases: the same database of firms with positive goodwill used in section 4.1 to study the determinants of impairment, here playing the role of treatment group, and a sample of firms with no goodwill on their balances that is to be used as control group. We focus on the four fiscal years before the adoption year of the amortisation regulation (pre-2016 period) and the four fiscal years after the adoption year (post-2016 period), including year 2016 itself. Consequently, the information on impairment decisions by the 3,906 firms in the treatment group needs to be completed for years 2016 to 2019.

Here, estimating impairment data is less obvious than during the impairment regulation period because both systematic amortisation and impairment – as well as the potentially confounding effects of corporate acquisitions and divestitures – may occur at the same time. Hence, we proceed as follows. First, we identify goodwill reductions caused by divestitures by checking whether the firm reports a non-zero result on discontinued operations. Second, we follow Li and Sloan (2017) to estimate goodwill amortisation as any reduction below a 15% threshold relative to the beginning goodwill balance – considering that a linear amortisation of goodwill over 10 years implies 10% amortisation rate over the first year, but increasing over time. Any goodwill reduction that exceeds that threshold is assumed to be impairment.

Finally, for the control group we randomly choose 4,000 firms among 534,435 firms available in SABI database with available data at least for years 2014 to 2018 (we opted to impose this restriction to ensure we would have sufficient data to test DiD before and after year 2016). This way, we end with 63,248 year-firm observations.

Table 2 provides the descriptive statistics of the dependent and control variables, as well as the differences in means between the treatment and control firms, separately for the pre- and post-periods. The data highlights the relevance to control for financial differences between treatment and control firms. Indeed, firms declaring goodwill are much larger, highly more productive per worker, invest more and are growing at a faster pace. All this results in in greater profitability of the treatment firms.

Table 2. Descriptive statistics and differences between pre-2016 and post-2016 regimes. Sample: listed and unlisted firms declaring goodwill plus control firms, 2012-2019.

PANEL A. Descriptive statistics of the full sample.

				Quantiles				
Variable	n	Mean	S.D.	Min	.25	Mdn	.75	Max
assets	63248	61474.14	6.6e+05	0.00	194.00	2063.00	15021.00	4.0e+07
revenues	61999	45069.70	3.9e+05	0.00	107.00	1422.00	16227.00	2.6e+07
GW_A	57337	2.31	6.51	0.00	0.00	0.00	0.40	46.00
ROA	47340	7.21	7.24	-11.10	2.50	6.30	11.30	28.40
ROA2	47346	7.54	7.61	-11.70	2.50	6.50	11.90	29.90
OperCF	28120	6.09	11.77	-34.20	0.00	4.50	11.80	55.10
Growth	48407	3.54	21.52	-69.90	-6.40	2.70	12.80	81.70
Size	56808	7.87	2.47	2.15	5.86	8.06	9.73	13.84
AGE	61964	3.04	1.03	1.00	2.00	3.00	4.00	4.00
LEVER	43466	63.26	31.71	2.40	40.90	63.40	82.30	231.50
Invest	50488	1.32	21.30	-52.80	-8.00	-1.40	5.60	100.20
Current	57316	57.39	29.53	0.90	33.10	60.70	83.40	100.00
Prodty	49375	272.04	426.20	0.00	66.50	134.60	299.10	4330.80
Opexrat	49210	91.18	22.78	-13.30	86.40	94.20	98.10	281.60

PANEL B. Differences in mean between samples

	Pre-2016 period						**Post-2016 period**								
	Treatment		**Control**		**Diff**		**Treatment**		**Control**		**Diff**		**Diff. in Diff.**		
	N	**Mean**	N	**Mean**	**p-value**		N	**Mean**	N	**Mean**	**p-value**		**Mean**	**p-value**	
Dependent variable															
ROA2	13,079	7.68%	10,940	6.06%	0.000	***	12,255	8.84%	11,072	7.37%	0.000	***	**-0.15%**	0.830	
Control variables															
SIZE	13,921	9.750	14,733	6.030	0.000	***	13,008	9.970	15,146	6.120	0.000	***	**0.130**	0.000	***
GROWTH	12,821	3.85%	11,002	0.58%	0.000	***	12,302	6.20%	12,282	3.19%	0.000	***	**-0.26%**	0.170	
LEVER	12,846	62.63%	9,115	67.87%	0.000	***	12,011	60.40%	9,494	63.32%	0.000	***	**2.32%**	0.000	***
INVEST	12,834	3.18%	12,108	-1.24%	0.000	***	12,185	3.24%	13,361	0.10%	0.000	***	**-1.27%**	0.020	**
CURRENT	14,162	55.05%	14,748	58.86%	0.000	***	13,279	56.04%	15,127	59.34%	0.000	***	**0.51%**	0.320	
PRODTY	13,623	363.86	11,369	146.54	0.000	***	12,823	383.88	11,560	163.21	0.000	***	**3.35**	0.063	*
OPEXRAT	13,879	92.40%	11,237	92.50%	0.738		13,061	90.22%	11,033	89.43%	0.005	***	**0.89%**	0.065	*

The difference-in-differences of ROA2 between the treatment and control firms shows an average ROA2 of 7.68% in the pre-2016 period and 8.84% in the post-2016 for treatment firms. Their profitability improved during the second period, and they are more profitable than control firms in any period. However, control firms after 2016 experienced a relative

improvement: the average ROA2 is 6.06% in pre-2016 and 7.37% in post-2016. This sums up to a difference in differences favourable to control firms, by 0.15% – in line with the assumption in H4 that managers of treatment firms made good use of accounting discretion during the impairment period.

5. Empirical results

5.1 Determinants of impairment

Table 3 provides the results of the fixed effects regression.[3] It should be noted that the scarcity of non-zero impairment decisions leads to very low R^2 results (4.9% within, 0.4% overall). Consequently, we focus on the interpretation of the coefficients of the variables and their significance. In an untabulated analysis we also tested one-period lagged variables of GW_A, NOA, ROA and LOSSFREQ, as well as dummy variables SM for listed firms and SCT for industrial effects, but none of them contribute to the regression.

Table 3. Determinants of impairment, 2012-2015.

```
Fixed-effects (within) regression               Number of obs      =       6,117
Group variable: id                              Number of groups   =       2,131

R-sq:                                           Obs per group:
     within  = 0.0491                                         min =           1
     between = 0.0039                                         avg =         2.9
     overall = 0.0043                                         max =           4

                                                F(9,3977)          =       22.84
corr(u_i, Xb)  = -0.6359                        Prob > F           =      0.0000
```

Imp_GW	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
CONSV	2.245424	1.044118	2.15	0.032	.1983686	4.29248
GW_A	-.3177444	.0423489	-7.50	0.000	-.400772	-.2347168
SIZE	-4.243241	.9136147	-4.64	0.000	-6.034439	-2.452044
LEVER	-.117228	.0366216	-3.20	0.001	-.1890268	-.0454291
NOA	-2.1251	.4658017	-4.56	0.000	-3.038332	-1.211867
LOSSFREQ	.0750125	.012268	6.11	0.000	.0509603	.0990647
yeard1	-1.660421	.3836433	-4.33	0.000	-2.412577	-.9082653
yeard2	-1.232262	.3676775	-3.35	0.001	-1.953116	-.5114078
yeard3	.1816483	.3540441	0.51	0.608	-.5124767	.8757732
yeard4	0	(omitted)				
_cons	50.62068	9.248628	5.47	0.000	32.48819	68.75318
sigma_u	13.841817					
sigma_e	9.2634814					
rho	.69066467	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(2130, 3977) = 2.73                     Prob > F = 0.0000
```

In the period 2012-2015, right before the introduction of the amortisation method in Spain, the determinants of firms reporting impairment are as follows. We obtain positive evidence of hypothesis H1a: the measure of reporting conservatism, CONSV, is positively related to

[3] The value of the Hausman test obtained in the contrast between fixed effects (FE) and random effects (RE) was 93.62 with a p-value=0.0000. This leads to rejection of the null hypothesis that RE provides consistent estimates.

the size of the impairment decision. Moreover, results are robust to using the alternative proxies for conservatism. This allows us to isolate the effect of managerial conservatism across the sample when testing for opportunistic behaviour in terms of timing and goodwill relevance. In this regard, we obtain positive evidence of both hypotheses H1b and H1c. On one hand, there is significant evidence (p=0.000) that the more residual goodwill is on balance, the more readily the company recognises impairment. On the other hand, the impairment recognised in 2012 and 2013 is significantly lower by 1.7 and 1.2 percentage points than that recognised in 2015. There is therefore a clear "bath" effect just before the new accounting standard starts to be applied.

Regarding control variables, it is worth noting the negative and significant relationship of SIZE with impairment: larger companies declared smaller impairments, taking most advantage of the pre-2016 regulations to act opportunistically. Moreover, consistent to our prediction, the more leveraged the company the more financial risk it takes and therefore the more it will try to delay the recognition of goodwill impairment. However, NOA shows a significant negative relationship with impairment – the opposite of what was expected. Recall that the objective of NOA is to account for accumulated effects in the balance sheet of previous accounting choices that might constrain managers' ability to optimistically bias earnings in the future. Instead, we find that the higher NOA, the lower the impairment recognized. We don't have an interpretation for this result. Finally, in terms of performance, the more frequently the firm experiences operating losses, the larger the impairment recognized. This is again consistent with the opportunistic interpretation: although firms performing poorly will be reluctant to recognize additional losses, if these are frequent, they might take the opportunity for a "big bath". Beyond that effect, we don't trace a significant impact of performance (in terms of ROA) over impairment.

Two robustness tests were implemented to see the possible impact of missing observations. Given that we could not determine the impairment decision for about 2% of the changes in goodwill, we check the impact on results of two opposite assumptions: i. all decreasing balances in goodwill were impairments (zero impairment for increasing balances); and ii. all changes in goodwill correspond to corporate transactions (i.e., impairments were zero). Notice that these assumptions are common in other studies (see, for instance, Li and Sloan, 2017). The results we obtain are qualitatively identical.

5.2 The impact of changes in regulation on financial performance

Table 4 presents the results of the regression devised to test hypothesis H2 – whether the profitability of treatment firms worsened with the introduction of the amortisation method in 2016. On the contrary, the coefficient on post-2016 × treatment is significantly positive

(p<0.01), showing that firms with goodwill on their balances saw their economic return (excluding any accounting impact of goodwill itself) improved relative to control firms after the introduction of the goodwill amortisation method. The coefficient is greater than that of the temporal dummy (0.277 vs. 0.260) and in terms of economic magnitude, increasing ROA 0.277 percentage points represents a relative improvement of 3.6% (0.27728/ 7.68) for treatment firms of introducing the new regulation.

Table 4. Impact of the change in regulation on financial performance, 2012-2019.

```
Fixed-effects (within) regression               Number of obs      =     28,224
Group variable: id                              Number of groups   =      5,632

R-sq:                                           Obs per group:
     within  = 0.3733                                         min =          1
     between = 0.3023                                         avg =        5.0
     overall = 0.3177                                         max =          8

                                                F(10,22582)        =    1345.36
corr(u_i, Xb)  = -0.2756                        Prob > F           =     0.0000
```

ROA2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
FC	0	(omitted)				
P2	.260135	.0871275	2.99	0.003	.0893591	.4309109
DT	.2772833	.1027387	2.70	0.007	.0759084	.4786583
Size	-1.06299	.100349	-10.59	0.000	-1.259681	-.8662993
LEVER	-.0555229	.0025331	-21.92	0.000	-.0604879	-.0505579
Growth	.0444533	.0014355	30.97	0.000	.0416397	.0472669
Invest	-.0136348	.0013006	-10.48	0.000	-.016184	-.0110856
Current	.0164907	.003134	5.26	0.000	.0103478	.0226336
Prodty	.0014737	.0001796	8.21	0.000	.0011217	.0018258
Opexrat	-.2738833	.0031813	-86.09	0.000	-.2801189	-.2676477
L_ROA2	.1930876	.0054819	35.22	0.000	.1823426	.2038325
_cons	42.57767	.9522332	44.71	0.000	40.71123	44.44411
sigma_u	5.6772033					
sigma_e	3.6153184					
rho	.71147481	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(5631, 22582) = 3.95                     Prob > F = 0.0000
```

All control variables show significant coefficients and with consistent interpretation relative to that reported in prior research. Thus, the three variables with positive expected impact on profitability are confirmed: sales growth, productivity (a positive sign for PRODTY and negative for OPEXRAT), and the return on assets in the previous fiscal year. Firm size shows a significant negative impact on return, what might come from a negative association with revenue growth for some firms.[4] Leverage also has a negative impact, in line with the agency costs perspective. Finally, investment in working capital would have a positive impact, but the impact of investment in fixed assets appears to be negative, suggesting that the short-term impact on turnover of the increased asset book values prevails over the long-term positive impact of investment on sales and profitability.

[4] Indeed, the correlation between SIZE and GROWTH for the whole sample is about null: 0.06.

6. Conclusions

This article delved into the debate on goodwill amortisation vs. impairment by testing the determinants of goodwill impairment recognition by Spanish firms before 2016, and the impact of the change in regulation that year over business performance.

Regarding impairment recognition, we obtain positive evidence that different measures of reporting conservatism are positively related to the size of the impairment decision. Beyond that, we obtain evidence of an opportunistic behaviour by the firms both in terms of timing and goodwill relevance. Thus, there is significant evidence that the more residual goodwill is on balance the more willing the company is to recognise impairment, and the impairment recognised in 2015 is significantly higher than that in 2012 and 2013 – suggesting a "bath" effect just before the new accounting standard was implemented.

Regarding the impact of introducing the goodwill amortisation over business performance, we obtain significant evidence that the profitability of the firms with goodwill in their balance sheets (excluding any accounting impact of goodwill itself) improved relative to control firms with the introduction of the amortisation method. The ROA of the treatment firms increased 0.277 percentage points relative to their peers after the introduction of the goodwill amortisation method, after controlling for firm size, revenue growth, leverage, investments, current assets, lagged profitability and productivity. It represents a relative improvement of 3.6% for the ROA of the treatment firms of introducing the new regulation.

These results would be in line with most recent studies suggesting that the systematic amortisation of goodwill paired with a periodic impairment test may lead to accounting that better reflects the underlying economics of goodwill (Li and Sloan, 2017). However, this is yet an ongoing research: both checking for possible errors and some robustness tests are still pending, so these results should not be taken as definitive.

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