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Abstract

The paper aims at unwinding the methodological challenges underlying the measurement and communication of goodwill impairment loss in relation to the implementation of fair value accounting. Deviating from a pure agency theory of the interpretation of the timing of the goodwill impairment losses measurement and communication, we suggest an organizational interpretation of goodwill impairment losses. We hypothesize that delay in reporting goodwill impairment losses can be driven by the lack of quality of performance measurement systems of intangible assets, and more specifically by the lack of quality of monitoring, of target setting and of external communication of intangible assets. We conducted the analysis on a sample of global listed companies whose Book to Market value was equal or greater than one in the period 2008-2012.
Finding suggests that the quality of performance measurement systems of intangible assets monitoring, and target setting matters in explaining the likelihood of delaying the recognition of the goodwill impairment losses. Results hold in the presence of a number of control variables.

Keywords: fair value accounting, goodwill impairment, intangible assets, performance measurement systems
JEL Classification: G14, M41, M48

1. *Introduction: relevance of intangible assets and fair value accounting*

One of the assumptions of the fair value accounting is certainly the ability of firms to be able to evaluate assets – both tangible and intangible – correctly and timely. From Table 1 we note that yet the market price and the book values of equities deviate, implying differences between market and accounting evaluations regardless of the GAAPs adopted.

Table 1: Price to book value at the end of 2012, excluding negative equity (Source Orbis)

Price to book value (excluding negative equity)			
Area	Local GAAPs 2012	IFRS 2012	Total
India	2.17	3.96	2.17
USA	4.86	2.87	4.06
China	2.87	6.94	4.42
Brazil	2.42	1.85	2.27
Russia	8.48	1.23	6.06
South Africa	2.29	14.48	12.96
Europa	10.12	3.73	6.72

Gaps in equity valuations have been studied in a number of ways. Research aims at informing policy makers and standard setters to increase transparency in financial markets and to improve the information contents of the accounting principles and rules. IFRS themselves were meant to reduce the gaps between accounting numbers and financial market valuations, but many factors imply that the IFRS accounting values and market evaluations diverge. One of the most recent stream of research investigates the use of unverifiable estimates in accounting evaluations (Beatty and Weber, 2006) in their relation with management discretion. In our research we would like to draw the attention of the quality of performance measurement systems of intangibles in relation to the use of estimates in the implementation of fair value accounting – as advocated

by the IFRS. We believe that fair value accounting calls for sophisticated measurement systems, especially when it comes to the evaluation of intangible assets. The sophistication of measurements, however, comes with delay, with experience, and with the full awareness that the intangible asset measurements bring advantage and benefit to the management practices.

A number of studies already warned against the odds of intangible assets measurements, their use in management practices and their influence on performance (Ittner, 2008) (Lev, 2001). Ittner (2008) offers a good introduction to the link between measurement of intangible (**at fair value**) and better management decisions, providing evidence on the performance consequences of the intangible assets measurement. Intangible assets represent expenditures on and the development of non-physical assets that are drivers of future economic performance and firm value. Andriessen (2004) identifies seven primary reasons for internal measurement of intangible assets: (1) focusing attention; (2) improving the management of intangible resources (3) creating resource-based strategies (4) monitoring effects from actions (5) translating business strategy into action (6) weighing possible courses of action and (7) enhancing the management of the business as a whole. All seven purposes are based on the assumption that measurement and management are strictly interrelated.

To provide evidence of our thinking we then focused on one intangible assets, *e.g.* goodwill. We studied in which way the quality (or lack of quality) in intangible assets monitoring, target setting and external communication impacts on the timing of the goodwill impairment losses. We believe that firms with more sophisticated systems of monitoring, target setting and communication of intangible assets are more timely in recognizing goodwill impairment losses, as they have better way to assess the value drivers of goodwill.

1.1. Goodwill impairment losses: a special focus on intangible assets measurement at fair value

After that SFAS142 and IAS 36 changed the accounting rules for goodwill a number of studies focused on the goodwill impairment losses to identify the antecedents and the consequences of goodwill

(fair value) accounting. Namely, the new regulations changed the accounting for goodwill in three specific ways: eliminating the periodic amortization of these assets into expenses, requiring that goodwill be assigned to a reporting unit for external reporting purposes that closely matched how management views the corporation's portfolio of business for internal purposes; and instituting an annual test for determining if assets are not carried more than their recoverable amount (goodwill impairment).

One of the main concern brought about by the new rules was that given that fair values are not readily available -rather the outcome of an estimation process- for many of the reporting units to which goodwill balances were assigned, managers would enjoy a certain amount of discretion when determining the recoverable amount*, e.g.* the value in use.

Management discretion in applying this standard can take a number of shapes, among them one of the most relevant is the timing of the impairment loss recognition. [1]

Few studies investigated which factors affect management's discretion in the timing of goodwill impairment losses disclosure.

Among others the study of Beatty and Weber (2006), conducted right after the introduction of the SFAS142 is particularly insightful. In that study, the timing of impairment in the first year adoption paired where on the income statement the impairment loss would be shown – an immediate recognition would be reported below "the-line" as cumulative effect of accounting change, while a delayed recognition would be reported into future above-the-line expenses. The structure of the financial covenants including or excluding effects of accounting charges; the firm financial risk, the bonus structure, the CEO tenure, and the listing environment were tested to be determinants of when the company would report the impairment losses.

[1] The discussion about the informativeness of the impairment, and consequently the discretion on (and need to regulate) the communication behaviour is out of the aim of this paper. We share the view of Kim and Yoon (2012) that companies disclosing impairment with delay present higher returns in the pre-impairment period, meaning that the market is not fully able to predict the impairment losses due to lack of specific communication about intangibles. Although this finding, the effort of regulators of different countries in trying to better enforce companies to impair assets is a clear sign of the relevance of timing in impairment.

A second study by Li and Sloan (2011) concluded that impairment manifest itself in few sizeable losses that follows a period of continuous deterioration of financial performances. Their conclusion is then that the impairment happens with delay, in more general terms and not only for the first year adoption.

A more recent study by Ramana and Watts (2012) further investigated the use of discretion and unverifiable estimates in goodwill impairment losses after the introduction of SFAS 142. Taking an agency theory perspective, they did not find any evidence of the association of goodwill non-impairment -in the sample of companies with indication to impair the goodwill- with manager's private information rent on positive future cash flow and with agency–based motives, including management interest in increasing their compensation and in shielding their reputation form the implications of a goodwill write-off. Evidence was found instead on the association between goodwill non-impairment and CEO compensation, CEO reputation and debt –covenant violation concern. The use of estimations in impairment goodwill decisions is, however, a very interesting one. We believe in fact the impairment estimations are grounded in the performance measurement systems as well as in the broader financial markets information context. This opens up a different perspective of analysis of goodwill impairment losses; we believe in fact that a possible determinant of the delay may be grounded in the measurement process itself, namely in how management is information-supported in making judgements on the verifiability of the impairment estimations, regardless of a specific vested interest.

As Bens well (2006) stated the impairment process is a measurement process of a complex nature that can be somewhat subjective and highly arbitrary, if not adequately informed. The author attributes the complexity to various factors: to the need to prior assign the goodwill to a reporting unit (vs the joint value production function), to the reasonability of the assumptions (vs the uncertainty of the future), to the adoption of asset valuation methodologies (vs the management accounting methodologies of budget and plans), to the verifiability of value (vs the diversification of strategies and the decentralization of organizational structure).

IAS 36 comments on the complexity of the impairment measurement process and further indicates how to support the estimation: "*cash flow projections should be based on reasonable and supportable assumptions, the most recent budgets and forecasts, and extrapolation for periods beyond budgeted projections. [IAS 36.33] IAS 36 presumes that budgets and forecasts should not go beyond five years; for periods after five years, extrapolate from the earlier budgets. [IAS 36.35] Management should assess the reasonableness of its assumptions by examining the causes of differences between past cash flow projections and actual cash flows. [IAS 36.34]*".

The IAS 36 is relevant for us in many ways. It states that the impairment measurement process is rooted on monitoring as well as targeting intangibles value drivers all together: the reasonableness of assumptions embedded in the impairment is valued against other assumptions, set forth in the targeting process. This is a very important principle as the principle assumes than any firm is up to the task, having designed and implemented an adequate performance measurement system of intangibles.

The availability of information to support the goodwill impairment measurement, however, depends then on the overall quality of the accounting information systems (Bartov *et al*, 2014) and more specifically, on the quality of performance measurement systems of intangibles (Ittner and Larcker, 1998) as in the intangibles' domain lay the most relevant sources of value drivers.

According to practice[2], the performance measurement system of intangibles assumes a measurement process founded on "integrated thinking that results in a periodic integrated report by a firm about value creation over time and related communications regarding aspects of value creation. The report is in fact a concise communication about how an organization's strategy, governance, performance and prospects, in the context of its external environment, lead to the creation of value in the short, medium and long term" (IIRC website).

Many researchers, and Lev (2001) specifically, pointed out that the integrated reporting would be beneficial for both firms and

[2] See the movement for Integrated Reporting (IIRC).

stakeholders. Businesses need a reporting environment that is conducive to understanding and articulating their strategy, which helps to drive performance internally and attract financial capital for investment. Stakeholders need to understand how the strategy being pursued creates value over time. Consistently, Kim and Yoon (2012) stated that the fair value accounting is useful despite the criticism, as it incorporates new information for the markets. In their study of companies with a price-to-book value below one, the sample disclosing impairment with delay presents higher returns in the pre-impairment period meaning that the market is not fully able to predict the impairment losses due to lack of specific communication about intangibles. Control variables associated with write-offs timing are market-to-book value ratio, price-earnings ratios, write-offs of non-goodwill assets, number of business segments, incidence of impairment losses, market capitalisation and leverage. Henning, Shaw and Stock (2011), in their study stated that many companies do not offer adequate *disclosure of* causes of goodwill *impairment losses*, making clear that the lack of transparency is also related to the methodological difficulties in determining the goodwill impairment loss. This confirms our belief that fair value accounting must be grounded on very solid measurement systems foundation.

Whether or not this foundation exists is rarely tested. Testing whether the quality of performance measurement system of intangibles reduces the delay in reporting and communicating goodwill impairment losses is the objective of our research.

2. *Research questions and hypothesis formulation*

Our basic research question is then whether the quality of performance measurement system of intangibles is an antecedent, *time-wise*, of the goodwill impairment losses in listed companies adopting fair value accounting.

The quality of the performance measurement systems takes different facets. We believe that the quality of a performance measurement system depends on three main outcomes: the first one, the quality of monitoring, the second the ability to provide the correct incentives to managers, and finally the ability to support

communication with stakeholders. As we look at these three outcomes, we draw from previous research, that the use of non-financial indicators can boost all of the three, while detecting the intangible value drivers.

According to previous research the quality of monitoring of the performance measurement system depends on the adoption of non-financial indicators, integrated with financial ones through one of the many reporting framework proposed. This is a general principle stated by Galbraith (1973) whereby the more the information available (both financial and non-financial), the higher the monitoring power of the performance measurement system *e.g.* the less the information asymmetries. This principle is made even more meaningful if we considered that while financial indicators are backward looking, the non-financial indicators are leading indicators (Kothary and Sloan, 1992, Ittner, Larcker, 1998; Banker et al, 2000).

We assume then that the quality of monitoring of the performance measurement systems is negatively associated with the likelihood of delaying goodwill impairment losses.

A second characteristic of the quality of performance measurement systems is the use of different indicators in the incentive systems, we named it targeting use. Measures are used to assign target and incentives only if they are linked to company value (Davila and Simon, 2001). Formalization and communication of the chain of linkages among different performance indicators (*e.g.* a strategy map, Kaplan, Norton, 1998) have been studied as determinants of the effectiveness of the entire performance measurement system (Bisbe, 2010) and of the communication of strategy (Banker *et al*, 2011), enhance both managers' information relevance and strategy appropriateness judgments (Cheng, Humphreys, 2012), reduce short-termism (Banker *et al*, 2004). Further, the use of non- financial indicators in the incentive systems is able to reduce the "common measure bias" (Libby *et al*, 2004) and the strategy "surrogation effect" (Choi *et al*, 2013), to increase the use of benchmark (Vera-Munoz et al, 2007) and to reduce conflicts (Wong-on-Wing et al., 2007). Further, adopting a multi-period principal-agent model, intangible assets are not verifiable for contracting purposes hence non-financial performance indicators should be optimal and efficient measures to be

long-term or medium-term contracted (and periodically re-negotiated) (Corona, 2009).

We assume then that the quality of targeting of the performance measurement systems is negatively associated with the likelihood of delaying goodwill impairment losses.

Having a high-quality performance measurement system is also the basis on which companies define voluntary disclosure policies, aiming to differentiate themselves by providing an enhanced level of information, which may help investors and creditors to understand the company better (Levinsohn 2001). The benefit of voluntary disclosure is very relevant for information disclosed about intangible asset (Kang and Gray, 2011). Voluntary disclosures can lower agency costs, reduce the cost of capital, and improve the market price of securities (Leuz and Verrecchia 2000; Botosan 1997; Hossain *et al.* 1994).

We assume then that the quality of external communication of the performance measurement systems is negatively associated with the likelihood of delaying goodwill impairment losses.

We drew from previous research a definition of impairment delay. From Ramanna and Watts (2012) we measured the delay in the presence of a pre-impairment book value of the firm equal or exceeding the firm market value (BTM_{it} equal or higher than one) and the absence of any reported goodwill impairment.

From previous research we have then been able to identify the most relevant factors in the explanation of the delay in goodwill impairment.

One first factor in determining the delay in goodwill impairment has to do with the complexity of goodwill impairment and the related verifiability of underlying assumptions. Based on some field interviews with top management as well as previous research, we gathered that the less diversified the business context and the less geographically dispersed the operations, the simpler the impairment measurement process. When the measurement process is simple the verifiability of the underlying assumptions is assured.

Hence, we hypothesized that the higher the verifiability of the impairment assumptions the higher the delay. This concept may appear counterintuitive especially in the light of what postulated by Ramanna and Watts (2012). The two authors stated that the use of

unverifiable assumptions delay the timing of goodwill write-offs. We deviated from that prediction – which by the way was not fully tested – mainly due to the timing of our respective research and the meaning that a *BTMit* equal or higher than one has in the respective timeframes. Rammana and Watts observed firms in 2003-2006 time period, in times of lateral equity market, whereas our study focuses on 2008-2012 time period, in times of sluggish equity market. We believe that in times of depressed equity market –our time frame – the equity market evaluation may resent very heavily of the general context, firms therefore would more strongly defend their accounting values against the market values. We predict then that companies delay the goodwill write-offs by means of verifiable assumptions.

A second cluster of factors to explain the impairment delay has to do with the magnitude of the goodwill write-offs and the degree of financial distress. In a sample of firms with a BTM_{it} equals or higher than one, *we hypothesize that the higher the magnitude of the goodwill write-offs and the higher the degree of financial distress, the lower the delay*. We believe that a timely write-off given the financial situation may be perceived as a way to regain momentum – for managers the "big bath incentive". Zucca and Campbell (1992) already proved that a "big bath" is one of the determinants of the write-offs. We expect then the coefficient to be negative.

A third cluster of factors takes care of the pressure that financial equity markets exert on firms to match their evaluation, and hence devaluate their goodwill when their the pre-impairment book value exceeds the market evaluation. In general terms, *we predict that the higher the market pressure the lower the delay*. From previous research we took market pressure proxies as investment returns (the lower the returns, the higher the pressure), the single vs multiple listing in the stock markets (multiple listing is associated with higher pressure) and finally the BTM_{it} (the higher the BTM_{it} the higher the market pressure).

We also believe that in the time frame that we observed, given the high volatility, the timing of the impairment would matter. We noted, in fact, that the frequency of impairments (versus non impairments) per year changes significantly in the years considered (*see in "Sample"*). We then introduced four dummies (2009, 2010, 2011 and

2012) to accounts for the timing of the impairment losses. We introduced this as a further test that our main assumptions would hold despite the changing external financial market condition.

3. *Research design*

To operationalize the measurement of our variables we drew from previous literature, when possible and we created new measures when needed.

From Ramanna and Watts (2012) we measured the delay in the presence of a pre-impairment book value of the firm equal or exceeding the firm market value (BTM_{it} equal or higher than one) and the absence of any reported goodwill impairment. The delay is then a dummy of 0-1.

For the quality of performance measurement systems of intangible assets we drew from Assets4. Assets4 seemed a particularly versatile data-base for our purposes as it features an integrated and broad view of measurements of environmental, social and governance (ESG) value drivers. The data-base collects information about how firms systematically monitor, improve and communicate ESG value driver to reflect intangible assets present in the firm at a given time. Table 2 reports a full description of questions used to assess the quality of the measurement processes in various areas: vision and strategy, employees satisfaction, client loyalty and customers satisfaction, emission, product innovation, resource efficiency, product responsibility, relation with community, human rights, diversity and equal opportunities, training and development. The construct of the Assets4 data-base draws directly from the integrated reporting systems key design variables as it separate out the phase of monitoring, from that target setting and lastly communication. A relative higher emphasis is, however, posed on the monitoring phase and in the target setting phase of the value drivers measurements. The communication phase is less emphasized.

Table 2: Description of Assets 4 Score

	Datastream Code (Mnemonic)	Question	Reclassification
1	CGVSD03S	Does the company monitor its integrated strategy through belonging to a specific sustainability index? And does the company monitor its integrated strategy through conducting external audits on its reporting?	Monitoring
2	CGVSD04S	Does the company set specific objectives to be achieved on the integrated strategy?	Targeting
3	CGVSO05S	Does the company publish a separate CSR/H&S/Sustainability report or publish a section in its annual report on CSR/H&S/Sustainability?	Communication
4	ECPED03S	Does the company monitor the employee satisfaction through the use of surveys or measurements?	Monitoring
5	ECPED04S	Does the company set specific objectives to be achieved on the employee satisfaction strategy?	Targeting
6	ECPEO11S	Does the company report data or studies which generally show improvements in the satisfaction and loyalty of its employees?	Communication
7	ECCLD03S	Does the company monitor the customer satisfaction or its reputation and relations with communities through the use of surveys or measurements?	Monitoring
8	ECCLD04S	Does the company set specific objectives to be achieved on customer satisfaction or fair competition?	Targeting
9	ECCLO03S	Does the company report the percentage of customer satisfaction?	Communication
10	ENERD03S	Does the company monitor its emission reduction performance?	Monitoring
11	ENERD04S	Does the company set specific objectives to be achieved on emission reduction?	Targeting
12	ENERO18S	Does the company report or provide information on company-generated initiatives to restore the environment?	Communication
13	ENPID04S	Does the company set specific objectives to be achieved on environmental product innovation?	Targeting
14	ENRRD03S	Does the company monitor its resource efficiency performance?	Monitoring
15	ENRRD04S	Does the company set specific objectives to be achieved on resource efficiency? AND Does the company comment on the results of previously set objectives?	Targeting
16	SOPRD04S	Does the company set specific objectives to be achieved on its products or services quality and responsibility?	Targeting
17	SOCOD03S	Does the company monitor its reputation or its relations with communities?	Monitoring
18	SOCOD04S	Does the company set specific objectives to be achieved on its reputation or its relations with communities?	Targeting
19	SOHRD03S	Does the company monitor human rights in its or its suppliers' facilities?	Monitoring
20	SOHRD04S	Does the company set specific objectives to be achieved on its human rights policy?	Targeting
21	SOHRO01S	Does the company report or show to use human rights criteria in the selection or monitoring process of its suppliers or sourcing partners? And does the company report or show to be ready to end a partnership with a sourcing partner if human rights criteria are not met?	Communication
22	SODOD03S	Does the company monitor the diversity and equal opportunities in its workforce?	Monitoring

23	SODOD04S	Does the company set specific objectives to be achieved on diversity and equal opportunity?	Targeting
24	SOEQD03S	Does the company monitor or measure its performance on employment quality?	Monitoring
25	SOEQD04S	Does the company set specific objectives to be achieved on employment quality?	Targeting
26	SOTDD03S	Does the company monitor its training and development programs?	Monitoring
27	SOTDD04S	Does the company set specific objectives to be achieved on the employee training and career development?	Targeting

We then re-labelled each question to refer to the three main steps in measurement: monitoring (M), targeting (T) and communication (C). We counted twelve questions descriptive of monitoring, ten questions descriptive of target setting and five descriptive of communication.

For each of the questions a score is reported to indicate the extent to which a company complies with monitoring, targeting and communication in intangible value drivers. We attributed one to each answer if the score exceeded the yearly average of all firms in the sample for the year *t,* zero otherwise. We then counted the positive (equal to one) values. We ended up with three indexes: one for monitoring, one for targeting and one for communication. The theoretical maximum for each of the indexes was respectively twelve, ten and five.

We took the logarithm of the beginning of period assets as a measure of size and a proxy for the magnitude of goodwill write-off as indicated by Ramanna and Watts (2012).

From Ramanna and Watts (2012) we also adopted a variant of the more general Herfindahl-Hirschman (H-H) index used to measure the segment concentration within a firm.

We calculated the H-H index for each firm *i* at time *t* as it follows:

$$\text{H-H Index} = \sum_{i=1}^{n} (s^2_i)$$

Above, *n* is the number of business segments in the firms, and s_i is the ratio of the *i*th business-segment sales to total firm sales in the year *t.* The index ranges from one to zero. If a firm has only one segment the H-H index is one; if a firm has several segments, but one of them is much larger than the others, the H-H index is close to one. As number of segments increases and as segments become of similar size the H-H index approaches zero. Thus an H-H index close to zero indicates a

firm with several equally sized segments, while an H-H index close to one indicate a firm with few disproportionally sized segments. From Datastream we could get two alternative segmentation of total revenues: *e.g.* a product segmentation and a geographical segmentation, hence we computed two H-H indexes: one based on product segmentation and one based on geographical segmentation. We then used the H-H index based on product to predictor of verifiable assumptions of impairment losses business-wise; and the H-H index geography as predictor of verifiable assumptions regulations and accounting-wise. We expect then that an high H-H index means more verifiable assumptions in the measurement of goodwill impairment losses both in terms of strategic segmentation (product) and applicable regulation and principles (geography). More verifiable assumptions justify a delay in reporting goodwill impairment losses.

Financial distress was measured against the leverage computed as the ratio of total debt (including financial leases) to total equity of firm *i* before the impairment losses at the end of year *t*. We adapted the definition from Kim and Yoon (2012). We used the leverage as a proxy for financial distress.

For the total investment return TIR_{it} we used the following ratio:

$$\frac{\text{(market price at the end of year}_t + \text{dividends per share+ any special dividend in each of the four quarters in year}_t)}{\text{market price at the end of year}_{t-1}} \text{ -1* 100}$$

We created a dummy for a single listing equal one and zero if firm *i* at time *t* was listed in more stock exchanges. We expect that a single listing environment reduces the market pressure and hence increases the likelihood of delaying goodwill impairment losses.

We took the value of book to market value (BTM_{it}) as it follows:

$$\frac{\text{(total assets of firm i at time t + impairment of goodwill of firm i at time t - total liabilities of firm i at time t)}}{\text{market capitalisation of firm i at time t}}$$

We used BTM_{it} to select the cases when an impairment of goodwill would be required. Similarly to other studies we assumed that a requirement for impairment would be there when the BTM_{it} is equal or higher then one. Subsequently in our sample of observations we

used the value of BTM $_{it}$ as a proxy for market pressure. We expect that the higher the BTM$_{it}$ the lower the likelihood of delayed impairment losses.

To test our assumptions, we estimate the following binary logit equations:

–

$$(1)\ Prob(Delay_{it}=1) = \beta 0 + \beta 1\ Quality\ of\ Monitoring_{it} + \beta 2\ Quality\ of\ Targeting_{it} + \beta 3\ Quality\ of\ Communication_{it} + \beta 4\ H\text{-}H\ Index\ (Product)_{it} + \beta 5\ H\text{-}H\ Index\ (Geography)_{it} + \beta 6\ Size_{it} + \beta 7\ Leverage_{it} + \beta 8\ Total\ Investment\ Return_{it} + \beta 9\ Single\ Listing_{it} + \beta 10\ BTM_{it} + \varepsilon_{it}$$

Where:

Dependent variable		**Value**	**Expected sign**
Delay$_{it}$	=	an indicator variable equal to one if firm *i* does not report goodwill impairment losses in year *t*, zero otherwise	
Independent variables			
Quality of Monitoring $_{it}$	=	count of 10 Assets4 monitoring percentage scores of firm *i* at time *t*, one if the percentage score is above the yearly average of for all sampled companies, zero otherwise	-
Quality of Targeting$_{it}$	=	count of 12 Assets4 target setting percentage scores of firm *i* at time *t*, one if the percentage score is above the yearly average of for all sampled companies, zero otherwise	-
Quality of Communication$_{it}$	=	count of 5 Assets4 communication percentage scores of firm *i* at time *t*, one if the percentage score is above the yearly average of for all sampled companies, zero otherwise	-

H-H Index (Product)$_{it}$	=	sum for *i=1* to *n* of squared ratio of sales in the product segment *i* out of total sales of firm *i* at time *t*	+
H-H Index (Geography)$_{it}$	=	sum for *i=1* to *n* of squared ratio of sales in the product geographic segment *i* out of total sales of firm *i* at time *t*	+
Size$_{it}$	=	log(10) of total assets firm *i* at time *t-1*	-
Leverage$_{it}$	=	ratio of total debt to total equity of firm *i* before the impairment losses at the end of year *t*	-
Total Investment Return$_{it}$	=	((market price end year *t* + dividends per share + special dividend-quarter 1 + special dividend-quarter 2 + special dividend-quarter 3 + special dividend-quarter 4) / market price-year end *t-1*) -1 * 100 of firm *i* at time *t*	-
Single listing$_{it}$	=	an indicator variable equal to one if firm *i* is listed in a single stock exchange in year *t*, zero otherwise 0	-
BTM$_{it}$	=	ratio of (total assets of firm *i* at time *t* + impairment of goodwill at time *t* – total liabilities at time *t*) to market capitalisation at the end of year *t*	-

$$(2)\ Prob(Delayit=1) = \beta 0 + \beta 1\ Quality\ of\ Monitoringit + \beta 2\ Quality\ of\ Targetingit + \beta 3\ Quality\ of\ Communicationit + \beta 4\ H\text{-}H\ Index\ (Product)it + \beta 5\ H\text{-}H\ Index\ (Geography\ )it + \beta 6\ Sizeit + \beta 7\ Leverageit + \beta 8\ Total\ Investment\ Returnit + \beta 9\ Single\ Listingit + \beta 10\ BTMit + \beta_{11}2009_{it} + \beta_{12}2010_{it} + \beta_{13}2011_{it} + \beta_{13}2012_{it} + \varepsilon it$$

Where:

Independent variables		Value	Expected sign
2009_{it}	=	an indicator variable equal to one if firm *i* reported goodwill impairment losses in year *2009*, zero otherwise	?
2010_{it}	=	an indicator variable equal to one if firm *i* reported goodwill impairment losses in year *2010,* zero otherwise	?
2011_{it}	=	an indicator variable equal to one if firm *i* reported goodwill impairment losses in year *2011*, zero otherwise	?
2012_{it}	=	an indicator variable equal to one if firm *i* reported goodwill impairment losses in year *2012*, zero otherwise	?

4. *Sample*

We took the time period 2008-2012 for each of the 4,105 companies included in the Global Index of Assets4. We found 20,525 firm/year observations for each of the variables. Not all fields were available at all times.

We then sorted the 20,525 firm/year observations based on Goodwill/Cost in Excess of assets purchased (Item WC18280 Datastream) at the end of the year greater than zero. We selected 14,625 firm/year observations. We then excluded the observations related to companies whose book to market value at the end of the year was less then 1 or missing. We ended up with 3,540 firm/year observations. The sample was further reduced for the outliers and missing data. The final sample is constituted by 3,374 firm/year observations, and 1,348 firms (Table 3).

Table 3: Sampling

	Observations Firm/year (Firms)
Total population	***20,525 (4,105)***
Goodwill (t)>0	14,625 (3,211)
Net of BTM (t) unavailable	262
BTM (t) <1	10,824
Total sample Goodwill t >0 and BTM>or equal 1	***3,540 (1,374)***
Outliers, missing data, negative Equity	166
Analysed sample	***3,374 (1,348)***

The sample included observations from many industry groups (Table 4), and mainly banks and financial institutions. Banks and financial institutions represent 12% of the sample. As this segment of industry is a regulated segment with very high importance in the respective economies, this may introduce noise in our data. The second most represented group are observations from life insurance firms (3%), also a regulated industry in most of the countries.

Table 4: Observation Industry Distribution

INDUSTRY GROUP (DataStream)	**Total**	**No delay**	**Delay**	**No delay %**	**Delay %**
Aerospace	5	1	4	0.12%	0.16%
Airlines	33	2	31	0.25%	1.21%
Alt. Electricity	14	3	11	0.37%	0.43%
Altertive Fuels	1		1	0.00%	0.04%
Aluminum	12	1	11	0.12%	0.43%
Apparel Retailers	5	1	4	0.12%	0.16%
Asset Managers	24	3	21	0.37%	0.82%
Auto Parts	43	5	38	0.62%	1.48%
Automobiles	42	4	38	0.50%	1.48%
Banks	410	129	281	16.02%	10.94%
Biotechnology	1	1		0.12%	0.00%
Brewers	17	6	11	0.75%	0.43%
Broadcast & Entertainment	48	14	34	1.74%	1.32%
Broadline Retailers	55	9	46	1.12%	1.79%
Building Mat.& Fix.	96	36	60	4.47%	2.34%
Bus.Train & Employmnt	5	2	3	0.25%	0.12%
Business Support Svs.	54	21	33	2.61%	1.28%
Clothing & Accessory	36	12	24	1.49%	0.93%
Coal	17	5	12	0.62%	0.47%

Comm. Vehicles.Trucks	32	5	27	0.62%	1.05%
Commodity Chemicals	36	1	35	0.12%	1.36%
Computer Hardware	40	3	37	0.37%	1.44%
Computer Services	17	2	15	0.25%	0.58%
Con. Electricity	80	26	54	3.23%	2.10%
Consumer Electronics	12	1	11	0.12%	0.43%
Consumer Fince	15	2	13	0.25%	0.51%
Containers & Package	13	1	12	0.12%	0.47%
Defense	6	4	2	0.50%	0.08%
Delivery Services	5		5	0.00%	0.19%
Diamonds & Gemstones	2	1	1	0.12%	0.04%
Distillers & Vintners	4		4	0.00%	0.16%
Divers. Industrials	78	14	64	1.74%	2.49%
Diversified REITs	12	5	7	0.62%	0.27%
Drug Retailers	15	2	13	0.25%	0.51%
Dur. Household Prod.	17	1	16	0.12%	0.62%
Elec. Office Equip.	15	1	14	0.12%	0.54%
Electrical Equipment	50	13	37	1.61%	1.44%
Electronic Equipment	25	7	18	0.87%	0.70%
Exploration & Prod.	51	7	44	0.87%	1.71%
Farm Fish Plantation	20	2	18	0.25%	0.70%
Fincial Admin.	9		9	0.00%	0.35%
Fixed Line Telecom.	39	14	25	1.74%	0.97%
Food Products	90	14	76	1.74%	2.96%
Food Retail.Wholesale	19	8	11	0.99%	0.43%
Footwear	5		5	0.00%	0.19%
Forestry	5		5	0.00%	0.19%
Full Line Insurance	51	18	33	2.24%	1.28%
Furnishings	12	5	7	0.62%	0.27%
Gambling	11	4	7	0.50%	0.27%
Gas Distribution	8		8	0.00%	0.31%
General Mining	17	4	13	0.50%	0.51%
Gold Mining	12	3	9	0.37%	0.35%
Healthcare Providers	20	2	18	0.25%	0.70%
Heavy Construction	95	20	75	2.48%	2.92%
Home Construction	27	7	20	0.87%	0.78%
Home Improvement Ret.	6	2	4	0.25%	0.16%
Hotels	10	3	7	0.37%	0.27%
Ind. & Office REITs	28	7	21	0.87%	0.82%
Industrial Machinery	45	13	32	1.61%	1.25%
Industrial Suppliers	29	8	21	0.99%	0.82%
Integrated Oil & Gas	56	2	54	0.25%	2.10%
Internet	4	3	1	0.37%	0.04%
Investment Companies	7	4	3	0.50%	0.12%
Investment Services	55	12	43	1.49%	1.67%
Investment Trusts	5	5		0.62%	0.00%
Iron & Steel	81	22	59	2.73%	2.30%
Life Insurance	100	20	80	2.48%	3.11%
Marine Transportation	44	7	37	0.87%	1.44%
Media Agencies	16	4	12	0.50%	0.47%
Medical Equipment	14	4	10	0.50%	0.39%

Medical Supplies	10	3	7	0.37%	0.27%
Mobile Telecom.	36	10	26	1.24%	1.01%
Mortgage Fince	10	1	9	0.12%	0.35%
Mortgage REITs	4	1	3	0.12%	0.12%
Multiutilities	36	13	23	1.61%	0.90%
Nondur.Household Prod	5	1	4	0.12%	0.16%
Nonferrous Metals	29	6	23	0.75%	0.90%
Oil Equip. & Services	50	18	32	2.24%	1.25%
Paper	50	10	40	1.24%	1.56%
Persol Products	9		9	0.00%	0.35%
Pharmaceuticals	30	4	26	0.50%	1.01%
Pipelines	5		5	0.00%	0.19%
Plat.& Precious Metal	6	1	5	0.12%	0.19%
Prop. & Casualty Ins.	56	2	54	0.25%	2.10%
Publishing	50	24	26	2.98%	1.01%
Railroads	2		2	0.00%	0.08%
Real Estate Hold. Dev	117	29	88	3.60%	3.43%
Real Estate Services	3	1	2	0.12%	0.08%
Recreatiol Products	6	1	5	0.12%	0.19%
Recreatiol Services	8		8	0.00%	0.31%
Reinsurance	32	1	31	0.12%	1.21%
Renewable Energy Eq.	25	5	20	0.62%	0.78%
Residential REITs	10	3	7	0.37%	0.27%
Restaurants & Bars	21	6	15	0.75%	0.58%
Retail REITs	16	5	11	0.62%	0.43%
Semiconductors	35	12	23	1.49%	0.90%
Soft Drinks	5	1	4	0.12%	0.16%
Software	15	4	11	0.50%	0.43%
Spec.Consumer Service	12	4	8	0.50%	0.31%
Specialty Chemicals	51	6	45	0.75%	1.75%
Specialty Fince	79	11	68	1.37%	2.65%
Specialty REITs	10	3	7	0.37%	0.27%
Specialty Retailers	37	12	25	1.49%	0.97%
Telecom. Equipment	26	10	16	1.24%	0.62%
Tires	4	1	3	0.12%	0.12%
Tobacco	1		1	0.00%	0.04%
Toys	6	3	3	0.37%	0.12%
Transport Services	29	4	25	0.50%	0.97%
Travel & Tourism	29	12	17	1.49%	0.66%
Waste. Disposal Svs.	13	2	11	0.25%	0.43%
Water	13	7	6	0.87%	0.23%
Total	3,374	805	2,569	100.00%	100.00%

The analysed observations belonged to many countries, but mainly US, Japan (Table 5). US and Japan represent respectively 17% and 15% of the sample. The size of the two economies does not compare well, which means that we definitely have noise in the data. The European observations are localised in mainly in Britain (around 7%),

in the overall sample the European observations could for approximately 31% of the overall observations.

Table 5: Observations country distributions

Country Code	Country	Total	No Delay	Delay	No Delay %	Delay %
AE	UNITED ARAB EMIRATES	3	0	3	0%	0%
AT	AUSTRIA	43	24	19	3%	1%
AU	AUSTRALIA	252	70	182	9%	7%
BE	BELGIUM	55	18	37	2%	1%
BR	BRAZIL	54	4	50	0%	2%
CA	CANADA	175	39	136	5%	5%
CH	SWITZERLAND	46	13	33	2%	1%
CL	CHILE	9	1	8	0%	0%
CN	CHINA	39	8	31	1%	1%
CZ	CZECH REPUBLIC	3	1	2	0%	0%
DE	GERMANY	84	28	56	3%	2%
DK	DENMARK	25	8	17	1%	1%
EG	EGYPT	16	2	14	0%	1%
ES	SPAIN	73	26	47	3%	2%
FI	FINLAND	31	7	24	1%	1%
FR	FRANCE	157	74	83	9%	3%
GB	UNITED KINGDOM	252	95	157	12%	6%
GR	GREECE	29	8	21	1%	1%
HK	HONG KONG	145	25	120	3%	5%
HU	HUNGARY	11	4	7	0%	0%
ID	INDONESIA	19	4	15	0%	1%
IE	IRELAND	13	4	9	0%	0%
IL	ISRAEL	15	1	14	0%	1%
IN	INDIA	29	3	26	0%	1%
IT	ITALY	120	43	77	5%	3%
JP	JAPAN	493	32	461	4%	18%
KR	KOREA. REPUBLIC OF	138	2	136	0%	5%
MX	MEXICO	9	2	7	0%	0%
MY	MALAYSIA	24	8	16	1%	1%
NL	NETHERLANDS	45	23	22	3%	1%
NO	NORWAY	28	9	19	1%	1%
NZ	NEW ZEALAND	1	0	1	0%	0%

PH	PHILIPPINES	18	3	15	0%	1%
PL	POLAND	30	5	25	1%	1%
PT	PORTUGAL	20	4	16	0%	1%
RU	RUSSIAN FEDERATION	28	10	18	1%	1%
SE	SWEDEN	45	17	28	2%	1%
SG	SINGAPORE	42	4	38	0%	1%
TH	THAILAND	5	0	5	0%	0%
TR	TURKEY	20	0	20	0%	1%
TW	TAIWAN. PROVINCE OF CHINA	85	6	79	1%	3%
US	UNITED STATES	578	147	431	18%	17%
ZA	SOUTH AFRICA	67	23	44	3%	2%
		3,374	805	2,569	100%	100%

The temporal distribution of observations presents distribution in all years (Table 6), with a prevalence in 2008.

Table 6: Observations yearly distribution

Year	Total	No Delay	Delay	No Delay %	Delay %
2008	825	226	599	28.07%	23.30%
2009	587	138	449	17.14%	17.46%
2010	485	106	379	13.17%	14.74%
2011	744	186	558	23.11%	21.70%
2012	733	149	584	18.51%	22.79%
	3,374	805	2,569	100.00%	100.00%

Table 7 presents the descriptive statistics. Our sample include 805 no-delay observations and 2,569 delay observations, e.g. 76% of total observations. The mean in *BTMit* shows a value of 2,05 in no-delay sample and a value of 1,65 in the delay sample. The means of *quality of monitoringit*, *targetingit a*nd *communicationit* show differences when comparing the no-delay group versus the delay group, and precisely the mean are higher in the no-delay group. We would like to observe that given the operationalization of the measures, the low values of the means indicate that only few companies are consistently above average in the quality of measurements.

Table 7: Descriptive statistics for the pooled sample: the no-delay panel and the delay panel.

	N			***Minimum***			***Maximum***			***Mean***			***Std. Deviation***		
	Total	*No Delay*	*Delay*	*Total*	*No Delay*	*Delay*	*Total*	*No Delay*	*Delay*	*Total*	*No Delay*	*Delay*	*Total*	*No Delay*	*Delay*
Delayit	3,374	805	2,569	0.00	0.00	1.00	1.00	0.00	1.00	0.76	0.00	1.00	0.43	0.00	0.00
BTMit	3,374	805	2,569	1.00	1.00	1.00	24.93	19.99	24.93	1.75	2.05	1.65	1.34	1.86	1.11
Quality of Monitoring it	3,374	805	2,569	0.00	0.00	0.00	10.00	10.00	10.00	2.54	3.27	2.31	3.04	3.34	2.91
Quality of Targetingit	3,374	805	2,569	0.00	0.00	0.00	8.00	7.00	8.00	1.07	1.32	0.99	1.22	1.36	1.16
Quality of Communicationit	3,374	805	2,569	0.00	0.00	0.00	5.00	5.00	5.00	1.17	1.43	1.09	1.27	1.36	1.22
Sizeit	3,361	803	2,558	4.43	4.59	4.43	9.58	9.58	9.43	7.08	7.23	7.03	0.80	0.90	0.76
H-H Index (Product)it	3,374	805	2,569	0.00	0.00	0.00	1.00	1.00	1.00	0.49	0.45	0.50	0.34	0.33	0.35
H-H Index (Geography)it	3,374	805	2,569	0.00	0.00	0.00	1.00	1.00	1.00	0.51	0.45	0.53	0.29	0.29	0.29
Leverageit	3,374	805	2,569	0.00	0.00	0.00	84.12	84.12	61.04	1.69	2.35	1.48	3.20	4.58	2.60
Total Investment Returnit	3,327	798	2,529	-97.63	-97.63	-95.96	508.59	385.83	508.59	-13.86	-22.52	-11.13	47.98	46.11	48.25
Single listingit	3,374	805	2,569	0.00	0.00	0.00	1.00	1.00	1.00	0.57	0.57	0.57	0.50	0.50	0.50

The *size* of companies falling into the two panels does not significantly differ on average. However, when looking at the *Herfindahl-Hirschman indexes* of *product concentration and geographical concentration* we note that the no-delay observations belong to firms that are slightly more concentrated then delay companies. The two panels significantly differ in terms of *leverage*, and namely the no-delay panel features on average an higher leverage then the delay panel. On average the *total investment return* is much higher (less low) in the no-delay population than in the delay population. There is no significant difference between the two panels in terms of *single versus multiple listing*.

Table 8 reports the Pearson correlation coefficient, and the accompanied *p*-values in parenthesis. Correlations are for the pooled sample of 3,374 observations. Variables are defined in paragraph 3. Consistent with the preliminary analysis shows, in column, 3 that the delay in reporting goodwill impairment losses is negatively correlated with the *quality of monitoring, targeting and communication of intangible assets*.

The correlations between the two concentration indexes (*H-H Product and H-H Geography*) show a positive association with the delay, meaning that the higher the product and the geographical concentration (values equal one means maximum concentration, *e.g.* single product, single geographic area) the higher the delay. *Size and leverage* are negatively related to the delay; the leverage, however, shows an association that we did not anticipate. *The total investment return* is also positively correlated with delay, against our assumptions. BTM_{it} shows a negative correlation with the delay, and this confirms our expectations.

All correlations are significant at the level of 0.05 level (2-tailed).

Single-listing is not significantly correlated to the delay.

Controlling for cross correlations in Table 8, we note in column 5 a strong positive and statistically significant correlation between the *quality of communication and the quality of monitoring* $\rho=0.787$, p-value below 0.01. This is somewhat expected as the communication assumes monitoring in the first place. Also *quality of monitoring* is associate with size $\rho=0.415$, p-value below 0.01. This also is expected

as larger companies attract more attention and the quality of communication is necessarily higher.

Other relevant positive associations are between *leverage* and BTMit (ρ=0.388, p-value below 0.01) and leverage and size (ρ=0.360, p-value below 0.01). Particularly, we interpret the association between leverage and *BTMi*t is an indicator of leverage as a sign of financial distress, as we anticipated.

Table 8: Pearson's correlations coefficients

	Delayit	*BTMit*	*Quality of Monitorin it*	*Quality of Targetingit*	*Quality of Communicationit*	*Sizeit*	*H-H Index (Product)it*	*H-H Index (Geography)it*	*Leverageit*	*Total Investment Returnit*	*Single listingit*
Delayit	1										
BTMit	-.127**	1									
	0										
Quality of Monitoringit	-.135**	-.042*	1								
	0	0.015									
Quality of Targetingit	-.114**	0.019	.332**	1							
	0	0.26	0								
Quality of Communicationit	-.117**	-.044**	.787**	.336**	1						
	0	0.01	0	0							
Sizeit	-.111**	.080**	.400**	.245**	.415**	1					
	0	0	0	0	0						
H-H Index (Product)it	.109**	-0.031	-.155**	-.080**	-.145**	-.320**	1				
	0	0.067	0	0	0	0					
H-H Index (Geography)it	.068**	-.035*	-.189**	-.071**	-.158**	-.192**	.226**	1			
	0	0.045	0	0	0	0	0				
Leverageit	-.116**	.388**	.103**	,087**	.111**	.360**	-.206**	-.102**	1		
	0	0	0	0	0	0	0	0			
Total Investment Returnit	.101**	-.230**	.034*	-.159**	0.029	.086**	-.053**	0.002	-.059**	1	
	0	0	0.05	0	0.092	0	0.002	0.91	0.001		
Single listing*it*	-0.003	0.019	-0.009	-.090**	-.054**	-.102**	.058**	-.097**	-0.003	0.006	1
	0.849	0.272	0.596	0	0.002	0	0.001	0	0.879	0.743	

** Correlation is significant at the 0.01 level (2-tailed);* Correlation is significant at the 0.05 level (2-tailed).

5. *Findings*

Table 9 presents the results from estimating the following binary logit equation:

$$Prob(Delay_{it}=1) = \beta 0 + \beta 1\ Quality\ of\ Monitoring_{it} + \beta 2\ Quality\ of\ Targeting_{it} + \beta 3\ Quality\ of\ Communication_{it} + \beta 4\ H\text{-}H\ Index\ (Product)_{it} + \beta 5\ H\text{-}H\ Index\ (Geography)_{it} + \beta 6\ Size_{it} + \beta 7\ Leverage_{it} + \beta 8\ Total\ Investment\ Return_{it} + \beta 9\ Single\ Listing_{it} + \beta 10\ BTM_{it} + \varepsilon_{it}$$

The regressions are estimated using 3,374 firms-years, comprised of 805 no-delay observations and 2,569 delay observations.

The model we tested is statistically significant, with a pseudo χ^2 =0.079 (Nagelkerke R Square). Columns 2 reports coefficients, columns 3 report changes in the odd ratio due to one standard deviation change in the independent variable, in columns 4 the accompanied *p*-values are reported.

The test posits that the quality of measurement systems of intangible assets (monitoring, targeting and communication) at time *t* for any firm *i* reduces the probability of delaying the goodwill impairment losses. However, the *quality of communication* is not statistically significant. However, as the *quality of monitoring* and the *quality of targeting* are highly positively correlated (Table 8, column 5) hence the test is positive anyhow. The marginal effect of one unit in the count of scores of the *quality of monitoring* on the probability that company *i* at time *t* delays the impairment of goodwill is in the range of 7%; the marginal effect of one unit in the count of scores of the *quality of targeting* on the probability that company *i* at time *t* delays the impairment of goodwill is in the range of 8% .e.g. the quality of performance measurement systems of intangible assets explains 15% of the probability of delaying the impairment of goodwill for firm *i* at time *t*.

In Table 9 we also observe a very interesting result e.g. a positive significant relation between the H-H index based on product segments and the goodwill impairment losses delay probability at time *t* for any firm *i.* The *higher the concentration (H-H index)* at time *t* for any firm *i,* the higher the probability of delaying the impairment of goodwill.

The marginal effect is very high e.g. about 83%, however, we have to observe that the H-H index spans from 0 to 1 and it reaches the value of one when the company is mono-segment, hence one unit change in the H-H index covers the all ranges of concentration degrees, as such the change in the H-H index would only happen in decimal points. Hence, we should also consider that the H-H index imply decimals points in the marginal effect. This result comes as predicted as the segment concentration means the use of more verifiable assumptions to support the impairment delay probability. In other words in case of higher concentration it is the easier for management to prove the verifiability of hypothesis to justify the goodwill losses impairment delay.

The same effect applies to geographical concentration as well, the marginal effect is, however, much lower compared to the product concentration, and it is not statistically significant.

The size as a proxy of the *magnitude of the goodwill write–offs*, as well as the *leverage* as a proxy of financial distress shows a negative association, as predicted, but they are not statistically significant.

In the third category of estimators we found that the *single-listing*, despite the negative anticipated sign is not statistically significant. The other two indicators of market pressure – the *BTMit* and the *investment return*- are statistically significant. However, whereas a unit change in the *BTMit* means a decrease in the delay probability of 15%- an the sign is negative as anticipated, a unit change in the investment return shows almost a negligible increase of the probability of delay. We here expected a negative sign.

Table 9: Results of binary logistic *Prob(Delayit=1) = β0 + β1 Quality of Monitoringit + β2 Quality of Targetingit +β3 Quality of Communicationit* + β4 *H-H Index (Product)it + β5 H-H Index (Geography)it + β6 Sizeit + β7 Leverageit + β8 Total Investment Returnit + β9 Single Listingit + εit* in the sample of 3,374 observations of firm *i* at time *t* with a BTM*it* equal to or higher than one.

Variables	*Coefficient*	*Odds ratio for the predictors*	*Significance p-value*
Quality of Monitoring it	*-0.07*	0.933	0.001
Quality of Targettingit	*-0.089*	0.915	0.012
Quality of Communicationit	*-0.021*	0.979	0.694
H-H Index (Product)it	*0.604*	1.829	0
H-H Index (Geography)it	*0.128*	1.137	0.333
Sizeit	*-0.05*	0.951	0.448
Leverageit	*-0.029*	0.972	0.071
Total Investment Returnit	*0.005*	1.005	0
Single listingit	*-0.068*	0.934	0.432
BTMit	*-0.155*	0.856	0
Constant	*1.921*	6.828	0

Table 10 presents the results from estimating the following binary logit equation:

Prob(Delayit=1) = β0 + β1 Quality of Monitoringit + β2 Quality of Targetingit +β3 Quality of Communicationit + β4 *H-H Index (Product)it + β5 H-H Index (Geography)it + β6 Sizeit + β7 Leverageit + β8 Total Investment Returnit + β9 Single Listingit + β10 BTMit +* β_{11} 2009_{it} + β_{12} 2010_{it} + β_{13} 2011_{it} + β_{13} 2012_{it} + *εit*

The regressions are estimated using 3,374 firms-years, comprised of 805 no-delay observations and 2,569 delay observations.

The model we tested is statistically significant, with a pseudo χ^2=0.081 (Nagelkerke R Square). Columns 2 reports coefficients, columns 3 report changes in the odd ratio due to one standard deviation change in the independent variable, in columns 4 the accompanied *p*-values are reported.
The test shows that there is no significant change in the results when considering the year of the goodwill impairment, except for the change in statistical significance of the quality of targeting process of firm i at time t.

Table 10: Results of binary logistic $Prob(Delay_{it}=1) = \beta 0 + \beta 1\ Quality\ of\ Monitoring_{it} + \beta 2\ Quality\ of\ Targeting_{it} + \beta 3\ Quality\ of\ Communication_{it} + \beta 4\ H\text{-}H\ Index\ (Product)_{it} + \beta 5\ H\text{-}H\ Index\ (Geography)_{it} + \beta 6\ Size_{it} + \beta 7\ Leverage_{it} + \beta 8\ Total\ Investment\ Return_{it} + \beta 9\ Single\ Listing_{it} + \beta 10\ BTM_{it} + \beta_{11} 2009_{it} + \beta_{12} 2010_{it} + \beta_{13} 2011_{it} + \beta_{13} 2012_{it} + \varepsilon_{it}$

Variables	*Coefficient*	*Odds ratio for the predictors*	*Significance p-value*
Quality of Monitoring it	*-0.077*	0.926	0.001
Quality of Targettingit	*-0.063*	0.939	0.158
Quality of Communicationit	*-0.028*	0.973	0.605
H-H Index (Product)it	*0.600*	1.823	0.000
H-H Index (Geography)it	*0.119*	1.127	0.368
Sizeit	*-0.049*	0.952	0.456
Leverageit	*-0.027*	0.973	0.087
Total Investment Returnit	*0.004*	1.004	0.000
Single listingit	*-0.066*	0.936	0.444
BTMit	*-0.159*	0.853	0.000
2009it	*-0.088*	0.916	0.559
2010it	*0.038*	1.039	0.818
2011it	*0.021*	1.021	0.891
2012it	*0.217*	1.243	0.193
Constant	*1,882*	6,576	0.000

6. *Conclusions*

In our research we hypothesized that one of the fair value implementation determinants has to do with the quality of performance measurement systems of intangible assets. We focused on goodwill impairment losses as one of the items that requires significant accounting measurements and estimations. We analyzed the timing of goodwill impairment losses as an outcome of the quality of performance measurement systems, where quality is further segmented in monitoring quality, targeting quality and external communication quality.

In so doing we deviated from a pure agency theory of the interpretation of the timing of the goodwill impairment losses measurement and communication, we suggested an organizational interpretation of goodwill impairment losses. We hypothesized that delay in reporting goodwill impairment losses can be driven by the lack of quality of performance measurement of intangible assets, and more specifically by the lack of quality in intangible assets monitoring, target setting and external communication. We conducted the analysis on a sample of global listed companies under market pressure to write-off goodwill - whose book to market value was equal or greater than one - in the period 2008-2012.

Findings suggest that the quality of performance measurement system in monitoring, and in target setting matters to explain the likelihood of delaying the recognition of the goodwill impairment losses. Results hold in the presence of a number of control variables such as the use of verifiable assumptions, the magnitude of goodwill write-offs, the financial distress and the market pressure.

We also tested whether the actual time of impairment of goodwill mattered, given the volatility of equity market along 2008-2012. We found that the model hold only for the quality of monitoring as the quality of targeting is not statistically significant.

Our findings are preliminary.

Some methodological upgrades would be needed to accommodate, at least partially, the noise in the data to account for regional equity market pressures and industry practices.

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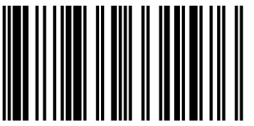
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