External audit and goodwill write-off

Silvia Ferramosca[1] · Giulio Greco[1] · Marco Allegrini[1]

Abstract Building on agency theory, we investigate whether and how salient external auditor characteristics (size, audit fees, non-audit fees, tenure) impact on the reported goodwill write-off. We use a sample of US firms applying SFAS 142. We find that Big-4 auditors are more prone to limit underestimated write-offs rather than overestimated write-offs and that auditors require higher fees from companies underestimating the write-offs. The findings are consistent with the auditors' preference for more conservative goodwill and earnings values, which reduce their litigation and reputation costs. This preference can converge with the managerial interest to use unnecessary overestimated goodwill write-offs for earnings management purposes (e.g. to smooth the income or take big baths). Our findings do not support the hypotheses that non-audit fees and tenure affect the goodwill write-off. Our paper contributes to prior literature on external audit and financial accounting choices. Our study suggests that leniently audited discretional fair value estimates are likely to compromise the role of auditing (and of financial reporting) as an external control mechanism. Our study can contribute to the current policy debate around goodwill accounting.

Keywords Goodwill write-off · SFAS 142 · Fair value · External audit

✉ Silvia Ferramosca
s.ferramosca@ec.unipi.it

Giulio Greco
giulio.greco@unipi.it

Marco Allegrini
marco.allegrini@unipi.it

[1] Department of Economics and Management, University of Pisa, Via C. Ridolfi, 10, 56124 Pisa, Italy

1 Introduction

This paper examines the relation between salient external auditor characteristics (size, audit fees, non-audit fees, tenure) and goodwill write-offs under the SFAS 142 accounting standard, which cancelled the goodwill amortisation and introduced an annual impairment test. Prior literature suggests that managers shift future goodwill write-offs into current periods in order to maximise the probability of future bonus compensation (Riedl 2004) or underestimate write-offs to prevent negative signals to the market (Ramanna and Watts 2012). Prior research also suggests that the auditors' concerns over potential reputation and litigation costs motivate them to prefer more conservative (or income-decreasing) accounting choices and to monitor income-increasing accounting choices more closely (DeFond et al. 2012; Kim et al. 2003). In this paper, we combine both literatures and explore whether and how the auditor's size, the audit fees, the non-audit fees and the auditor's tenure impact the reported goodwill write-off. To the best of our knowledge, this is the first paper to undertake such an investigation.

Given the discretion allowed by accounting rules, the auditor's role in reviewing goodwill write-off is critical. It is not surprising that the US PCAOB expressed concerns about the audit deficiencies related to impairment testing and called for more research on the managers' and the auditors' behaviour (Bratten et al. 2013). Likewise, the European Financial Reporting Advisory Group (EFRAG) issued a report criticising the goodwill write-offs' excessive subjectivity under the IAS/IFRS and launched a public consultation on the re-introduction of mandatory goodwill amortisation (EFRAG 2014).

Recently, accounting scholars have argued that the ambiguous nature of the goodwill impairment makes such an estimate unverifiable *ex-post* and hardly auditable (Ramanna and Watts 2012). Audit practitioners are aware of the difficulties; however, they have confidence in the auditability of fair value estimates and believe that thorough audit procedures can be put in place to ensure that the goodwill write-off is sound and coheres with the firm's underlying economics. The US Statement on Auditing Standard No. 101 outlines the auditor's tasks in case of fair value measurements.[1] Furthermore, external auditors use several guides to review fair value measurements and disclosures (e.g. AICPA 2013; Pricewater-houseCoopers 2013). The AICPA also issued a non-authoritative guide to support auditors in auditing fair value measurements, including a toolkit entitled "Auditing Fair Value Measurements and Disclosures", which is available on the AICPA's website (AICPA 2002). This guide provides an illustrative audit programme on the application of SFAS 142 and outlines several tasks. The tasks include: assessing the management's capabilities to perform appropriate valuations; evaluating whether the accounting policies for goodwill are consistent with the industry trend and with

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[1] "Audit procedures dealing with management's assumptions are performed in the context of the audit of the entity's financial statements. The objective of the audit procedures is therefore not intended to obtain sufficient competent audit evidence to provide an opinion on the assumptions themselves. Rather, the auditor performs procedures to evaluate whether the assumptions provide a reasonable basis for measuring fair values in the context of an audit of the financial statements taken as a whole" (SAS No. 101, p. 1882).

previous goodwill estimates; and determining whether the identification and the allocation of asset and liabilities of the reporting units are appropriate (AICPA 2002, pp. 67–76). By performing these tasks, the "auditors will be obtaining an understanding of the assumptions and methods of fair value measurement, and assessing their reasonableness. They will also be testing data used in the analysis" (AICPA 2002, p. 105).

In this paper, we analyse US firms in the 2003–2007 period. We partition the goodwill write-offs into an expected portion, given a set of economic determinants, and an unexpected discretionary portion. Positive discretionary portions signal goodwill write-off overstatements, whilst negative discretionary portions signal goodwill write-off understatements. We then regress the goodwill write-off understatements and overstatements on the auditors' characteristics. Our findings show that Big-4 auditors are prone to constrain more underestimated write-offs than overestimated write-offs. Underestimated write-offs are more likely to result in future late large write-offs, which may trigger possible litigation and threaten the auditors' reputation. The large auditors' preference is for more conservative goodwill and earnings values, which reduce their reputation and litigation costs. The findings also show that auditors overall charge lower audit fees to clients with overestimated write-offs because they are considered less risky. We do not find evidence that the auditor's tenure and the non-audit fees affect the goodwill write-off.

This paper can contribute to the academic literature on auditors' characteristics and financial accounting choices. We show how the auditors' preference for more conservative goodwill write-off accounting aligns with managers' interest in using unnecessary overestimated write-offs as earnings management tool, for example, to smooth the income or take big baths. While prior studies on goodwill write-off focus the attention on managers' incentives to manage earnings through the income-effect of over- or underestimated impairment losses, we shift the focus on auditors' incentives to acquiescence with the client's goodwill estimates (Francis et al. 1996; Riedl 2004; Beatty and Weber 2006; Godfrey and Koh 2009; Ramanna and Watts 2012; Greco et al. 2015). Our paper suggests that highly discretionary fair value estimates, like the SFAS 142 goodwill write-offs, are not only difficult to audit but can provide incentives for the auditors to deliver lenient audits. This situation compromises the role of an external audit (and of financial reporting) as an external control mechanism. Our work is related to concurrent studies on auditor conservatism (DeFond et al. 2012; Lee et al. 2006; Kim et al. 2003; Becker et al. 1998; Basu 1997). The key findings corroborate prior studies on the asymmetric preference of large auditing firms, which are more effective in constraining income-increasing earnings management policies (Francis and Wang 2008; Chung et al. 2003; Basu et al. 2001). We add to the literature that this asymmetric preference of auditing firms towards conservative estimates is complex and depends on multiple incentives including not only auditor size but also audit fees and non-audit fees. However, we do not find evidence that auditor tenure provide an incentive to over- or underestimate goodwill write-offs. Hence, in contrast to the extant literature on auditor conservatism using e.g. positive and negative unexpected returns (Basu et al. 2001), or accruals (Cano-Rodríguez 2010) we test auditor conservatism in the

context of goodwill write-off where information asymmetries and verifiability are accentuated (Watts 2003). Basu (1997) argues that accruals incorporating write-off are more likely to reflect conservatism than other accruals. A recent stream of literature also suggests that the goodwill impairment regimes elevates the role of auditing firm in the joint production of financial reporting together with the management; the auditing firm in this context is more likely to take on a consulting position which in turn strengthens its possible influence on conservative estimates (Bepari and Mollik 2015; Jones and Higgins 2006; Brown and Tarca 2005).

While prior studies mainly focus on auditor conservatism we tested also the hypotheses that auditors in certain circumstances may prefer non-conservative estimates. Auditor tenure and non-audit fees are a case in point because these two characteristics likely direct to higher auditors expertise and firm-specific knowledge, which should reduce the asymmetric bias towards conservative results. However, we fail to provide evidence in this direction, implying that auditor income-decreasing preference prevails, further corroborating prior studies on auditor conservatism. Our study contributes to the above discussion by providing additional evidence on the conservative preference of auditors assessed with a highly discretionary fair value measurement like the goodwill write-off (Ramanna and Watts 2012).

Our study has practical implications. We provide evidence corroborating recent concerns about the use of inherently subjective fair value estimates and about how effective the audit is on such estimates. Our study may provide arguments for the recent debate about goodwill accounting and the re-introduction of mandatory goodwill amortisation (EFRAG 2014).

The remainder of the paper is organised as follows: Sect. 2 reviews the literature on the use of the goodwill write-off as an earnings management tool. Section 3 develops the hypotheses. Section 4 displays the methods used to test the stated hypotheses, and in Sect. 5 we discuss the empirical findings. The conclusions are presented in Sect. 6.

2 The goodwill write-off as an earnings management tool

Previous literature suggests that owner-manager agency conflicts prompt managers to use write-offs for earnings management purposes. Management exploits the discretion allowed by accounting rules to move future write-offs into current periods for agency-related reasons, such as remuneration concerns and signalling to the financial markets (Greco et al. 2015; Ramanna and Watts 2012; Riedl 2004). Some studies find evidence that managers recognise overestimated write-offs to report large losses or "big baths" (Riedl 2004). By doing so, the management: (1) "saves" future periods from the write-offs, (2) maximises the probabilities of future earnings-based bonuses and payments (Godfrey 2006), and (3) signals to the outside world that "bad times" are behind and better periods lie ahead (Riedl 2004). Other researchers have found that managers use unnecessary write-offs to smooth the firm's income (AbuGhazaleh et al. 2011; Guler 2006). Thereby, managers moderate the overall net income volatility, while they keep the profits above the threshold

specified in earnings-based bonus plans (Guler 2006). Several studies suggest that incoming CEOs report large, unnecessary write-offs in their first year of appointment to improve investors' perceptions of the firm's future financial performance, exploiting the opportunity to blame the prior management for the write-off (Masters-Stout et al. 2008; Zang 2008). Regardless of the managerial aims, an overestimated goodwill write-off results in income-decreasing manipulation, underestimated goodwill value and clouded future firm profitability perspectives.

Managers can underestimate write-offs (or even avoid the recognition) to protect their target earnings-based bonus compensation, their own share value and/or their reputation (Ramanna and Watts 2012). Brochet and Welch (2011) find that directors who have more acquisition experience are more sensitive to agency conflicts when it comes to their goodwill write-off decisions, as they are more likely to face higher reputation costs. Ramanna and Watts (2012) find evidence that write-offs are, on average, lower in firms in which the CEO is more sensitive to reputation costs. Managerial shareholding exacerbates the incentive to avoid or understate goodwill write-offs. Owner-managers are concerned that goodwill write-offs directly map into stock prices, affecting their own wealth (Greco et al. 2014; Ramanna 2008; Beatty and Weber 2006). As the level of ownership grows, owner-managers are more likely to have a long tenure as directors and to be responsible for the original acquisition decision that generated the impaired goodwill. Since write-offs suggest that the acquisition price was too high, reputation costs can be added to private wealth concerns, which leads to underestimated write-offs (D'Onza et al. 2014; Ramanna and Watts 2012; Beatty and Weber 2006). Underestimated goodwill write-offs result in income-increasing manipulations, inflated goodwill values and clouded future firm profitability perspectives.

In this paper, we partition the goodwill write-off into a discretionary portion and a non-discretionary portion. The discretionary portion captures the managerial subjective write-off. The non-discretionary portion captures the expected write-off given a set of economic factors, such as a firm's performance, growth opportunities and industry trends. Positive discretionary portions signal goodwill write-off overstatements, whilst negative discretionary portions signal goodwill write-off understatements.

3 Auditor characteristics and goodwill write-offs

The auditors' function of deterring earnings management practices derives from their ability to recognise material errors and to make clear any sophisticated forgeries of financial reporting (DeAngelo 1981). Overall, our prediction is that quality auditors can better constrain the use of discretionary goodwill write-offs. However, in literature, there is not a unique definition for audit quality, as the concept is multi-faceted and complex. Various factors can lead to an audit of high or low quality. High-quality audit principles and procedures carried out by professional and expert auditors may ensure an independent opinion on the fairness and reliability of the financial reporting. A quality audit is likely to result, firstly, from a well-weighted combination of auditor requisites, amongst which we can find:

objectivity, independence, competence and experience. Nonetheless, neither literature nor the professional sphere has reached a consensus on the delineation of these features. Moreover, individual characteristics are not sufficient to obtain a quality audit (Knechel et al. 2013). A quality audit is also affected by the audit process characteristics, in other words, by the implementation and effectiveness of audit procedures by the personnel (López and Peters 2012; Caramanis and Lennox 2008; O'Donnell and Schultz 2003) as well as by the auditor incentives, for example, audit fees, non-audit fees, audit tenure (Hribar et al. 2014; Carey and Simnett 2006). Francis (2011) maintains that audit quality is simultaneously affected by six units of analysis: audit inputs, audit processes, accounting firms, audit industry and audit markets, institutions, economic consequences of audit outcomes. Moving from this comprehensive understanding, Knechel et al. (2013) propose a "balanced scorecard" to view the different aspects affecting audit quality. The main problem linked with research on audit quality is that it cannot be measured directly. As a consequence, audit quality cannot be measured either *ex-ante* or *in-itinere*. Only after the occurrence of any problems might we be able to judge the audit as being low-quality, and even *ex-post*, it is likely that the judgement is based upon indirect indicators of "non-quality" or audit quality proxies.

We develop our hypotheses using four different proxies of audit quality, specifically: auditor size, audit fees, non-audit fees and auditor tenure. We assume that these proxies directly affect the auditor competence and perception of audit risk leading to a different behaviour towards the use of discretionary goodwill write-offs. In practice, auditors can participate in harming the financial reporting quality to maintain client harmony or to reduce the risk of litigation with third parties (Stolowy and Breton 2004; Revsine 1991).

Large auditing firms are often considered a guarantee of an effective audit, as they have more resources to invest in training and in creating industry expertise (Francis and Krishnan 1999). Large auditing firms have incentives to deliver high-quality audits because they have a good reputation to uphold. Large auditors also have higher litigation costs than small auditors. In the case of wrong opinions or a failure to discover breaches, large auditors suffer significant damages to their brand reputation and high litigation costs if sued (Becker et al. 1998; DeAngelo 1981; Francis and Krishnan 1999). It is also more likely that legal proceedings are instituted against large auditing firms as their larger revenues makes them more inviting (Khurana and Raman 2004; Lennox 1999; St. Pierre and Anderson 1984). Several studies find that firms audited by large auditors have lower discretionary accruals than firms audited by small auditors (DeFond and Subramanyam 1998; Ding and Jia 2012; Kim et al. 2003). Other studies find that firms involved in frauds are less likely to use large audit firms (Farber 2005) and that the earnings response coefficient (ERC) of large auditors' clients is higher than that of small auditors' clients (Teoh and Wong 1993). These findings are consistent with large auditors' motivation to foster their reputational capital, protect their market position and avoid risks.[2]

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[2] There is ample literature suggesting that a change in auditors, if initiated by the auditor (i.e. resignations), is associated with their perceptions of the client risk (Landsman et al. 2009; Krishnan and

Recent studies argue that, compared with small auditors, large auditors are effective at constraining the income-increasing accruals but are less interested in constraining the income-decreasing accruals (Kim et al. 2003). Income-decreasing accruals result in conservative accounting and decrease reputation and litigation risks, for which large auditors have less appetite than small auditors.

By analysing the earnings conservatism through the impact of the discretionary use of goodwill write-offs, the present work expands on prior studies with respect to the differences in conservatism between large and small auditing firms (Ettredge et al. 2012; Francis and Krishnan 1999). The estimates underlying the goodwill write-offs are highly subjective and tied to fair value measurements (Ramanna and Watts 2012). Compared with other estimates (e.g. working capital assets estimates), these measures are forward-looking, have an impact on the financial markets and convey the firms' underlying economic conditions and opportunities (Gu and Lev 2011; Godfrey and Koh 2009; Zucca and Campbell 1992). Finally, as underlined by a large body of the literature, litigation with auditors usually claims that assets and revenues are overestimated or, conversely, that liabilities and expenses are underestimated (Basu et al. 2001; Carcello and Palmrose 1994; St. Pierre and Anderson 1984).

Large auditing firms could be more lenient with overestimated write-offs, which commonly occur when managers want to smooth the income or take big baths, or when the CEO changes (Beatty and Weber 2006; Riedl 2004). Overestimated write-offs result in reduced income, more conservative goodwill value in the balance sheet and more prudent disclosure about the firm's future perspective. Overestimated write-offs reduce large auditors' reputation and litigation risks and, at the same time, allow the management to achieve its earnings management objectives.

Furthermore, large auditors have incentives to avoid underestimated write-offs and reduce the potential for reputation and litigation costs. The write-off underestimation can benefit managers in multiple ways, for example, by protecting their own share value and/or their reputation and ensuring them a higher compensation tied to the earnings. However, underestimated write-offs imply a

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Footnote 2 continued

Krishnan 1997). The audit risk is influenced by several causes, including the client's financial reporting quality, internal control system and the management integrity (Johnstone and Bedard 2004; Carcello and Palmrose 1994). When the financial reporting quality, measured for example through the use of discretionary accruals (in our case, by the discretionary use of goodwill write-offs) is low, the auditor's reputation and litigation costs are more at risk than the financial distress of the client (Bonner et al. 1998; DeFond 2004). Within the fraud categories linked with the litigation risk, prior literature includes asset overvaluation (or expense undervaluation) but not asset undervaluation (or expense overvaluation) (Bonner et al. 1998). Following this common belief over time, there has been a sort of displacement leading academic literature to focus mainly on income-increasing accruals and conservative auditor behaviour. However, DeAngelo (1981) did pioneering work by defining the "quality of audit services (…) to be the market-assessed joint probability that a given auditor will both (a) discover a breach in the client's accounting system, and (b) report the breach". Thus, we derive that the auditor should detect any (opportunistic) discretionary use of the GAAP, regardless of their effect on the income. Therefore, the auditor should assume a prevention role for both the direction of the manipulation, either income-increasing or income-decreasing accruals. Hence, we add to this literature by providing empirical evidence that large auditors are more effective at preventing aggressive or "non-conservative" accounting choices and are not interested in goodwill write-offs overestimations.

higher risk of late large write-offs with multiple financial consequences, including a drop in stock prices and increased scrutiny by investors and lenders regarding the firm's financial position. We thus expect that large auditing firms have incentives to monitor goodwill write-offs asymmetrically and formulate the following hypotheses according to the direction of the discretionary use of the write-off:

Hypothesis 1:   *Ceteris paribus*, large auditing firms prevent goodwill write-off understatements and do not prevent goodwill write-off overstatements.

Prior literature suggests that auditors charge companies engaging more actively in earnings management higher audit fees, due to increased audit risks (Frankel et al. 2002; Srinidhi and Gul 2007; Hogan and Wilkins 2008). Chen et al. (2011) experimentally find that the enforcement of the evidence extent or higher external verification accompanied by stronger auditor scepticism reduces anticipated earnings management relative to the previous year. In this perspective, Budescu et al. (2012) find that it is very important for the auditor to put in place both traditional and less traditional tests to provide more unbiased audit evidence when the financial statements are intentionally manipulated. Additional tests undoubtedly increase the audit fees for the extra work required to obtain less biased audit evidence. The cost therefore appears to be firmly tied to the client's earnings management attitude, and aggressive earnings management behaviour requires additional work to balance the increased audit risk. While the audit risk model predicts that audit firms charge higher fees to companies with more discretional accounting, auditors' behaviour can change according to the direction of managerial discretion.

Overestimated goodwill write-offs may be considered to provide more conservative income and asset values. The auditors can charge more conservative and less risky clients lower fees and thus be more lenient with opportunistically overestimated write-offs (DeFond et al. 2012). The auditor might judge the overestimation of the goodwill write-offs to be more reliable since it discloses to investors a more conservative representation of the economic-financial position of the firm.

By contrast, underestimated goodwill write-offs provide inflated income and asset values. Inflated goodwill values obscure firms' future perspectives and harm investors' forecast capabilities (Li et al. 2011). Inflated goodwill values are also more likely to result in late, unexpectedly large write-offs. Late large goodwill write-offs increase investors' and lenders' scrutiny of the firm's financial reporting reliability and threaten the auditors' reputation. Companies underestimating write-offs are likely to engage in aggressive earnings management. Owing to the increased audit risk, auditors require higher fees from companies engaging in aggressive earnings management (Hogan and Wilkins 2008). Such an expectation is consistent with Habib et al. (2013), who empirically find that auditors charge a premium price to compensate for the additional audit risk resulting from equity overvaluation. This prediction might also be supported by another stream of literature suggesting that higher audit fees, likewise, might be a "sweetener" for the auditor to pander to the management's representation (Ronen 2010). Several studies test auditor independence using abnormal audit fees and explain the unexpected fees

as a bond between the auditor and the firm (Hope and Langli 2010; Larcker and Richardson 2004).

We posit the following hypotheses relating the audit fees to the goodwill write-off understatement or overstatement.

Hypothesis 2:   *Ceteris paribus*, audit fees are positively associated with goodwill write-off understatements.

Hypothesis 3:   *Ceteris paribus*, audit fees are negatively associated with goodwill write-off overstatements.

The non-audit fees can impair the auditor's independence and its monitoring effectiveness[3] (Frankel et al. 2002; Ronen 2010). The non-audit fees can convert the auditor's role from external independent reviewer into an insider adviser (Francis 2006). The empirical research failed to find the "smoking gun" evidence that the provision of non-audit services is associated with audit failures or more earnings management (Cahan et al. 2008; Ashbaugh et al. 2003; Chung and Kallapur 2003). An alternative view is that the non-audit fees are compensation for the auditors' expert advice on a complex issue like the goodwill write-off (KPMG 2014). Firms interested in more accurate goodwill write-off estimates may seek additional advice on the issue. Hence, the non-audit services would include advice on the business plans and forecasts used in the write-off measurement (Bratten et al. 2013). Taking into account the benefits of knowledge spill-overs that follow from the provisions of non-audit services, Lim and Tan (2008) find that higher non-audit fees are positively and significantly associated with audit quality for clients audited by specialist auditors. Based on these studies, we test the hypothesis that the additional advice compensated for by the non-audit fees lead to more accurate goodwill write-offs and reduce both opportunistic understatement and overstatement.

Hypothesis 4:   *Ceteris paribus*, the non-audit fees are negatively associated with both the overstatement and the understatement of the goodwill write-off.

The auditors' tenure can be either beneficial or detrimental to the reliability of the goodwill write-off. While there is an acknowledged body of literature investigating the benefits versus threats to auditor independence relating to auditor tenure, as far as we know, there is no prior study that investigates the impact of auditor tenure in the goodwill context. The results may provide empirical support for the debate on

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[3] At present, there are strong national regulations for auditors' qualifications and independence. With reference to the independence issue, the Sarbanes–Oxley Act requires that audit committees (instead of management) appoint auditors and decide on their pay. In addition, *Rule 2-01 of Regulation S-X* addresses a set of restrictions to safeguard auditor independence both in mindset and for compliance with generally accepted standards and processes. The rule determines constraints to any financial and business relation between the auditor and the audited firm and identifies certain non-audit services as risky to auditors' independence, e.g. bookkeeping, appraisal or valuation services, management functions or human resources and so forth. The Sarbanes–Oxley Act requires that all services (with minor exceptions) be approved in advance by the audit committee and that such approvals be disclosed to investors on a periodical basis in public reports. In accordance with the Statements on Auditing Standards, the independent auditor should then be professionally qualified with the education and experience sufficient to ensure that material misstatements are detected and that his/her opinion is based upon reasonable procedures and in accordance with GAAS (CPAs 1972).

mandatory auditor rotation, as the literature is still inconclusive (Casterella and Johnston 2013). A long tenure increases the auditor's client-specific knowledge (Chen et al. 2008; Beck and Wu 2006; Johnson et al. 2002). An in-depth knowledge of the firm can be very useful to the audit of the goodwill write-off in several ways. An in-depth knowledge of the firm can help auditors understand when the benefits of acquisitions do not materialise, triggering a write-off. Longitudinal firm-specific knowledge can help the auditors understand when the benefits of the goodwill are exhausted, allowing timely write-offs. Once a loss in the goodwill value is detected, firm-specific knowledge can help the auditors measure the write-off with adequate projections extrapolated from past performance. Overall, long tenures develop other relevant client-specific knowledge that could potentially influence the impairment procedure, such as changes in management or key directorship, as well as changes in strategy and market positioning. The strategic changes also affect the composition of the cash-generating units and a different goodwill allocation and valuation. Proper firm knowledge can help the auditors understand the proper allocation of goodwill amongst the cash-generating units. Long tenure makes it possible for auditors to gather wide-ranging information from different client firm offices. With a large information base, the auditors can create a sort of *control panel* on litigation risks and costs, operational trends, credit access and financial situation.

Long tenures can be detrimental to the auditors' monitoring effectiveness, as they can imply an "excessive familiarity" with the client. The *Code of Ethics for Professional Accountants* issued by the International Ethics Standards Board for Accountants (IESBA 2014) defines a familiarity threat to independence as the risk that a professional accountant, because of a long or close relationship with a client or employer, becomes too sympathetic to their interests or too accommodating. The *Code of Professional Conduct* issued by the American Institute of CPAs gives a similar definition of the familiarity threat (AICPA 2014). The academic literature suggests that such familiarity impairs the auditor's independence and impartiality (Chi and Huang 2005). The familiar auditor is more prone to comply with a well-known client, for which investments in *ad hoc* technologies and personnel were made over the years. The familiar auditor is interested in maintaining client harmony and turning a blind eye to earnings management (Wang and Tuttle 2009). A very familiar auditor–client relationship thus makes the auditor more prone to accept the client firm measurements and to abandon its professional scepticism.

We posit two alternative hypotheses on the association between auditor tenure and opportunistic goodwill write-off. On the one hand, the long-tenured auditor's superior knowledge of the firm can lead to more accurate goodwill write-offs and prevent both goodwill write-off understatement and overstatement. On the other hand, the familiarity and the subsequent loss of independence could lead to a mild audit and the passive acceptance of the management's goodwill write-off estimates, whether understated or overstated.

Hypothesis 5a: *Ceteris paribus*, auditor tenure is negatively associated with both the overstatement and understatement of the goodwill write-off.

Hypothesis 5b: *Ceteris paribus*, auditor tenure is positively associated with both the overstatement and understatement of the goodwill write-off.

To summarise, our overall research question is that different auditors' quality influences goodwill impairment, either upward or downward. This overarching proposition is next articulated in the following five recapped hypotheses according to certain auditor-related characteristics. The first one concerns with auditor size and we expect that it prevents only goodwill write-off understatements consistently with their conservative behaviour. The second and third ones are related to audit fees. We predict that audit fees are respectively positively and negatively associated with goodwill write-off understatements and overstatements. Indeed, through goodwill write-off understatements the auditor reputational and litigation risks are higher while with goodwill write-off overstatements the auditor provides an opinion on a more conservative net income. Hypothesis four regards non-audit fees for which we expect a negative association with over- and understated goodwill write off. As a matter of fact, non-audit fees may be due to auditor extra-work on the firm, which in turn boost the auditors understanding. Also, an expert and skilled auditor may tick off higher non-audit fees due to more sophisticated and thorough audit procedures, leading to more accurate estimates. Finally, hypothesis five is split into two. On the one hand, in hypothesis 5b we predict that longer tenure increase the auditor firm- and industry-specific knowledge correspondingly reducing the risk of over- or underestimated goodwill write-off. On the other hand, in hypothesis 5b we test whether a longer tenure intensifies the auditor–client bond threatening auditor independence and scepticism allowing both over- and understatements of goodwill write-offs.

4 Research methodology

4.1 Sample selection

We used the intersection of Compustat and Audit Analytics databases. We downloaded all the firms available on Compustat between 2003 and 2007. We selected a pre-crisis period, as the subsequent period may be affected by differing incentives that would substantially cloud our results. For example, during crisis periods the management may be more tempted to take a big bath in order to create a buffer for future periods, as the stakeholders in crisis period already expect bad results and look forward to future periods. We obtained 24,380 firm-year observations and 5495 individual firms. We found 23,179 non-write-off observations and 1201 goodwill write-off observations. We then merged the database with the Audit Analytics using Stata. We found 1038 goodwill write-off observations with the audit data required for the analysis. Following prior literature (Chao and Horng 2013; Godfrey and Koh 2009), we include in our sample only impairing firms.[4] In the robustness checks, we address potential self-selection and find consistent results.

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[4] The estimation of discretionary goodwill write-off requires that we consider only impairing firms (Chao and Horng 2013). We estimate the discretionary loss on the basis of economic factors. By design, in almost all the cases, firms with zero impairment will have a negative discretionary write-off. In the

4.2 Hypotheses testing

To test our hypotheses, we rely on a two-stage treatment effects model (Greene 2003). This model is useful to address the issue of the endogeneity involving accounting choices and auditor selection (Kim et al. 2003). In the first stage, we estimate a multivariate probit model in which the dependent variable is the probability that managers choose a large auditing firm[5] (Kim et al. 2003).

Model 1: First stage treatment effects model

$$BIG4_{it} = \beta_0 + \beta_1 AUDFEES_{it} + \beta_2 NAS_{it} + \beta_3 TENURE_{it} + \beta_4 GTA_{it} + \beta_5 ROA$$

$$+ \beta_6 MTB_{it} + \beta_7 LEV_{it} + \beta_8 SIZE_{it} + \sum_{l=1}^{9} \beta_{9,l} Industry_{it} + \sum_{l=1}^{5} \beta_{10,l} Time + \varepsilon_{it}$$

where $BIG4_{it}$ = dummy variable, 1 if the audit firm is a Big-4, 0 otherwise; $AUDFEES_{it}$ = audit fees on total assets for firm i at time t; NAS_{it} = percentage of non-audit fees on total fees for firm i at time t; $TENURE_{it}$ = 1 if the auditor tenure is 3 years or less, 2 if the auditor's tenure is between four and 9 years, 3 if the auditor's tenure is more than 10 years; GTA_{it} = goodwill on total assets; ROA_{it} = return on assets; MTB_{it} = firm's i market-to-book value at time t; $LEVit$ = leverage proxied by the liabilities to total assets ratio at time t; $SIZE_{it}$ = firm's i size, proxied by the total assets at time t; $Industry_{it}$ = dummies for industry effects; $Time_{it}$ = dummies for year effects.

The dependent variable is a dummy (BIG4), and it assumes the value of 1 if the auditor is a Big-4 audit firm, 0 otherwise (Choi et al. 2012; Firth et al. 2012).

Following the recommendations by Wooldridge (2002, p. 562), we include all the explanatory variables related to the auditor characteristics used in the second stage: audit fees, non-audit fees and auditor's tenure. We measure the audit fees (AUDFEES) as the ratio of the audit fees to the total assets. Prior literature suggests that the audit fees are generally higher for larger firms and that they do not imply a higher audit quality per se (Lawrence et al. 2011). Also, large companies tend to have large auditors that ask a premium price, which is related to their greater pricing power and not necessarily the quality of the services offered (Lawrence et al. 2011). To avoid the noise related to the client's and auditor's characteristics in the audit fees and to better capture the quality of the audit service, we deflate the audit fees on the total assets (Hoitash et al. 2007; Hay et al. 2006; Kinney et al. 2004; Tsui et al. 2001; Simunic 1980). In other words, by considering the audit fee relative to the firm's size, we aim to capture the quality component of the audit (Hay et al. 2006).

We measure the non-audit fees (NAS) as the percentage that non-audit fees make up out of the total fees (Srinidhi and Gul 2007; Frankel et al. 2002). "The rationale

Footnote 4 continued

robustness check, we estimate the discretionary write-off using a Heckman two-stage model. However, we consider only the discretionary write-offs of impairing firms in the analyses (Chao and Horng 2013, Table 6, p. 64). A similar procedure is also found in Godfrey and Koh (2009).

[5] We define the large auditing firms as the first four auditing firms during the period sample 2003–2007 that this paper covers, or the "Big-4": PricewaterhouseCoopers, Ernst & Young, Deloitte and KPMG.

for this measure is that the auditor's economic bond is driven by the non-audit services" (Srinidhi and Gul 2007, p. 12). Both the audit fee and the non-audit fee are size-dependent, an advantage of this measure is that it is independent of the client's and the auditor's size (Frankel et al. 2002). Also, Srinidhi and Gul (2007) report that the Securities and Exchange Commission (SEC) (2002), Congress and other regulatory bodies have used this measure in policy making and regulation.

Following Lim and Tan (2010), we use a score to measure the auditor's tenure (TENURE): 1 if the auditor's tenure is 3 years or less; 2 if the auditor's tenure is between four and 9 years; 3 if the auditor's tenure is more than 10 years. To ensure robust measurement, we start counting the years since 1992—10 years before the application of SFAS 142.

We also control for a set of financial variables that may influence the firm's propensity to select a Big-4 auditor. Firstly, we consider the weight of the goodwill on total assets. The relative amount of goodwill may influence the auditor's choice, since a high amount may require a more accurate and complex audit. We use the variable GTA, measured as goodwill on total assets. Based on prior literature (Francis et al. 1996; Kim et al. 2003), we include in our model firm profitability (ROA), firm growth opportunities (MTB) proxied by the market-to-book ratio, and the firm's size (SIZE) and leverage (LEV). Prior research suggests that the choice of a large auditor is positively associated with size and growth opportunities and negatively associated with financial leverage (Francis and Krishnan 1999).

In the second stage, we follow the recommendations by Wooldridge (2002, p. 562), and we do not include at least one instrument included in the first stage, namely the GTA.[6] We separately regress the goodwill write-off understatements and overstatements on the auditor's size (BIG4), the audit fees (AUDFEES), the non-audit services (NAS) and the auditor's tenure (TENURE). We add controls for the firm's profitability, growth opportunities, size and leverage. We also control for industry and time effects. The second stage is estimated with an OLS regression with standard errors robust to heteroscedasticity.

Model 2: Second stage treatment effects model

$$
\begin{aligned}
GWOUnder\ &statements_{it}/GWOOver\ statements_{it} \\
&= \beta_0 + \beta_1 BIG4_{it} + \beta_2 AUDFEES_{it} + \beta_3 NAS_{it} \\
&\quad + \beta_4 TENURE_{it} + \beta_5 MTB_{it} + \beta_6 ROA_{it} + \beta_7 LEV_{it} + \beta_8 SIZE_{it} \\
&\quad + \sum_{l=1}^{9} \beta_{9,l} Industry_{it} + \sum_{l=1}^{5} \beta_{10,l} Time + \beta_{11} MILLS_{it} + \varepsilon_{it}
\end{aligned}
$$

where GWO Understatement/GWO Overstatement$_{it}$ = firm's i absolute value of negative/positive discretionary write-offs; BIG4$_{it}$ = dummy variable, 1 if the audit

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[6] The GTA (goodwill on totals assets) variable can be a useful instrumental variable (IV). The goodwill is the cumulative effect of past acquisitions, also made by different CEOs. It incorporates the benefits of lagged variables, since it affects the *current* choice of a large auditor, while such a choice does not affect acquisitions made years before. Also, the mere presence of a goodwill, as a result of past acquisitions, does not affect the impairment per se (most public companies have goodwill) because the impairment is related to current performance and estimates about future perspectives.

firm is a Big-4, 0 otherwise; $AUDFEES_{it}$ = audit fees on total assets for firm i at time t; NAS_{it} = percentage of non-audit fees on total fees for firm i at time t; $TENURE_{it}$ = 1 if the auditor's tenure is 3 years or less, 2 if the auditor's tenure is between four and 9 years, 3 if the auditor's tenure is more than 10 years; MTB_{it} = firm's i market-to-book value at time t; ROA_{it} = return on assets; LEV_{it} = leverage proxied by the liabilities to total assets ratio at time t; $SIZE_{it}$ = firm's i size, proxied by the total assets at time t; $Industry_{it}$ = dummies for industry effects; $Time_{it}$ = dummies for year effects; $MILLS_{it}$ = inverse Mills ratios obtained from the probit estimate of Model 1.

4.3 Goodwill write-offs understatement and overstatement

We measure the goodwill write-offs understatement/overstatement as the absolute value of the negative/positive discretionary write-offs, where the discretionary write-offs are measured as the difference between the observed write-offs and the estimated write-offs in the regression of Model 3. We estimate the following Model 3 using a fixed-effects panel data regression.

Model 3

$$WO_{it} = \beta_0 + \beta_1 E_{it} + \beta_2 OCF_{it} + \beta_3 SALES_{it} + \beta_4 STOCK_{it} + \beta_5 MTB_{it} + \beta_6 LEV_{it}$$
$$+ \beta_7 SIZE_{it} + \sum_{l=1}^{9} \beta_{8,l} Industry_{it} + \sum_{l=1}^{5} \beta_{9,l} Time + \varepsilon_{it}$$

where WO = firm's i reported goodwill write-off for period t (reflected as a positive amount), divided by total assets at the end of period t − 1; E_{it} = firm's i average 3-year change in pre-write-off earnings from period t to t − 1, scaled by the totals assets at t − 1; OCF_{it} = firm's i average 3-year change in operating cash flows from period t to t − 1, scaled by the total assets at t − 1; $SALES_{it}$ = firm's i average 3-year change in sales from period t to t − 1; $STOCK_{it}$ = firm's i average 3-year change in the stock return period t to t − 1; MTB_{it} = firm's i market-to-book value at time t; LEV_{it} = leverage proxied by the liabilities to total assets ratio at time t; $SIZE_{it}$ = firm's i size, proxied by the total assets at time t; $Industry_{it}$ = dummies for industry effects; $Time_{it}$ = dummies for year effects.

Model 3 estimates the expected non-discretionary write-offs by regressing the observed write-offs on total assets (WO) over a set of economic factors, identified in the literature as possible determinants of goodwill write-offs (Chao and Horng 2013; Godfrey and Koh 2009; Riedl 2004). Model 3 includes three measures of the firm's performance (Francis et al. 1996; Riedl 2004): the average 3-year change in the pre-write-off earnings (ΔE), the average 3-year change in the operating cash flows (ΔOCF) and the average 3-year change in the total sales (ΔSALES). The change in the sales and the change in the pre-write-off earnings measure the economic performance of the firm, whilst the change in the operating cash flow captures the financial performance. We expect a negative relationship with write-offs for all these variables, since a negative performance should be associated with higher write-offs. For all these variables, we use a 3-year change. Francis et al.

([1996](#)) use a 5-year time frame in their study on the determinants of the goodwill write-off, and Riedl ([2004](#)) uses a 1-year change. We believe that a 3-year time span sounds reasonable while 5 years is probably too long a time span in any business environment, especially in the 2000s, and 1 year is too short.

We consider two market-based determinants of the goodwill write-off. Firstly, we consider the average 3-year firm's stock return (STOCK). The change in the stock return captures the changes in the market expectation regarding the firm's future profitability. Negative changes in stock return suggest that the firm's goodwill is impaired and that the future profitability is likely to be lower than expected. We also control for the market-to-book-value ratio (MTB). Low MTBs, especially below 1, suggest that the firm goodwill may be impaired (Beatty and Weber [2006](#); Riedl [2004](#)).[7]

We add a control for the firm leverage (LEV), measured by the firm's liabilities to total assets ratio at time t (Godfrey and Koh [2009](#)). Leverage can be associated with either more or fewer write-offs. On the one hand, more indebted firms are likely to be subjected to stricter controls by external auditors, investors and lenders. This may force the indebted firms to make more adjustments to the value of their goodwill through write-offs. More indebted firms may also record fewer write-offs to prevent more in-depth scrutiny of their financial health and/or to prevent the violation of debt covenants. We control for the firm's size (SIZE), proxied by the total assets at time t.

Finally, we include controls for the industry and year effects, since the goodwill write-off is likely to be affected by the industry trend (e.g. change in consumer preferences, technological obsolescence, changes in industry regulation). For the industry, we consider the one-digit SIC code.

5 Empirical results

5.1 Descriptive statistics

Table [1](#) reports the breakdown of goodwill write-offs per year. There are 1201 goodwill write-off observations, with an average write-off worth the 5.8% of the total assets. The highest number of goodwill write-offs (256) and the highest average write-off on total assets (6.5%) come from 2003.

Table [2](#) reports the descriptive statistics. The Big-4 auditors audited 58.9% of the total number of firms. The average audit fees are 0.3% of the total assets, and the mean non-audit fees are the 18.4% of total fees paid by the firms. The average auditor tenure is between four and 9 years.

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[7] The change in the stock return and the market-to-book ratio may capture the same phenomenon from different perspectives. The change in the stock return may measure the change in the market value. The market-to-book ratio, especially when below 1, suggests that the goodwill is impaired at a specific point in time. A firm with a negative change in its market value may still keep a high MTB ratio. A firm with a positive change in its market value may still have a MTB ratio below 1. Thus it can be useful to capture both the change dimension (through the change in the stock return) and the relation between the market and book value.

Table 1 Breakdown of goodwill write-offs per year

Year	Number of goodwill write-offs	Mean goodwill write-offs on total assets
2003	256	0.065
2004	231	0.051
2005	239	0.059
2006	222	0.054
2007	253	0.061
All years	1201	0.058

Table 2 Descriptive statistics (n = 1.038)

	Mean	Median	SD	5th percentile	95th percentile
Dependent variable					
WO	0.058	0.014	0.089	0.000	0.290
DWO	0.000	−0.022	0.080	−0.087	0.186
Financial data					
E	0.016	0.005	0.043	−0.046	0.110
OCF	0.008	0.005	0.033	−0.046	0.072
SALES	0.093	0.075	0.145	−0.124	0.368
STOCK	0.734	0.145	1.623	−1.233	4.326
MTB	2.168	1.802	1.596	−0.000	5.410
LEV	0.576	0.573	0.261	0.180	0.959
SIZE	5.680	5.950	3.03	0.557	10.278
Audit variables					
AUDFEES	0.003	0.002	0.003	0.000	0.098
NAS	0.184	0.133	0.198	0.000	0.577
TENURE	1.980	2.000	0.773	1.000	3.000
BIG4	0.589	1.000	0.491	0.000	1.000

Variables definition: WO = firm's i reported goodwill write-offs for period t (reflected as a positive amount), divided by total assets at the end of period $t - 1$; E_{it} = firm's i average 3-year change in pre-write-off earnings from period t to $t - 1$, scaled by the totals assets at $t - 1$; OCF_{it} = firm's i average 3-year change in operating cash flows from period t to $t - 1$, scaled by the total assets at $t - 1$; $SALES_{it}$ = firm's i average 3-year change in sales from period t to $t - 1$; $STOCKit$ = firm's i average 3-year change in the stock return period t to $t - 1$; MTB_{it} = firm's i market-to-book value at time t; LEV_{it} = leverage proxied by the liabilities to total assets ratio at time t; $SIZE_{it}$ = firm's i size, proxied by the total assets at time t; Industry-by-year$_{it}$ = dummies for industry-by-year fixed effects; $AUDFEES_{it}$ = audit fees on total assets for firm i at time t; NAS_{it} = percentage of non-audit fees on total fees for firm i at time t; $TENURE_{it}$ = 1 if the auditor tenure is 3 years or less, 2 if the auditor's tenure is between four and 9 years, 3 if the auditor's tenure is more than 10 years; $BIG4_{it}$ = dummy variable, 1 of the audit firm is a Big-4, 0 otherwise

5.2 Goodwill write-off understatement and overstatement estimation

Table 3 displays the regression of Model 3. The goodwill write-offs (WO) are associated with negative changes in the pre-write-off operating performance (E) in the 3 years preceding the write-off (p value <0.05). This finding indicates that firms undertake goodwill write-offs when the benefits of the goodwill are likely to be exhausted.

The goodwill write-offs are also significantly associated with negative stock returns (STOCK). The correlation coefficient for stock returns (STOCK) is negative and significant at the 1% level. The negative stock return indicates that the market does not expect further benefits for the firm's profitability deriving from the goodwill and anticipates a decline in the goodwill (and in the firm) value.

The firm leverage (LEV) is significantly associated with the goodwill write-off at the 5% level. Indebted firms appear to be more prone to adjust their goodwill values, possibly due to stricter controls by investors and lenders. The goodwill write-off is also negatively associated with the firm size (SIZE) at the 1% level across the regressions.

5.3 Empirical findings

Table 4 displays the probit regression of the Big-4 auditor choice model (Model 1). The Big-4 auditor choice is positively associated with the firm's size (SIZE) (p value <0.01) and the firm's growth option, proxied by the market-to-book value (MTB) (p value <0.01). These findings are consistent with prior research, e.g. Francis and Krishnan (1999) and Kim et al. (2003). We find that the Big-4 auditor choice is positively associated with the firm profitability (ROA), with p value <0.05, whilst it has a negative, weakly significant association with leverage (LEV) (p value <0.10). Finally, the Big-4 auditor choice is positively significantly associated with the tenure (TENURE) (p value <0.05). The result suggests that large auditing firms are more likely to have long tenures.

Table 5 displays the regression of Model 2. Table 5 shows that the auditors' size (BIG4) is negatively associated with goodwill write-off understatements (correlation coefficient significant at the 1% level), while the auditors' size (BIG4) is not significantly associated with goodwill write-off overstatements. The auditor's size does not appear to be associated with signed discretionary write-off.

The findings show that large auditing firms (BIG4) tend to prevent underestimated goodwill write-offs but are more lenient with overestimated goodwill write-offs. The results suggest that large auditors are concerned with inflated goodwill values (and higher earnings), as they imply a higher risk of untimely large write-offs with possible damages to the large auditors reputational capital and the potential for future litigation. Such reputation and litigation risks are high for large audit firms. By contrast, large auditing firms (BIG4) have little incentive to prevent overly conservative estimates, as conservatism decreases their reputation and litigation risks. The findings provide empirical support for Hypothesis 1.

Table 5 shows that the audit fees (AUDFEES) have a positive significant association with the goodwill write-off understatements (correlation coefficient

Table 3 Regression of Model 3 dependent variable: goodwill write-off on total assets (WO)

E	−0.000**
	(0.000)
OCF	−0.001
	(0.000)
SALES	−0.000
	(0.000)
STOCK	−0.001***
	(0.000)
MTB	−0.000
	(0.000)
LEV	0.001**
	(0.000)
SIZE	−0.014***
	(0.001)
Const	0.151***
	(0.000)
Industry controls	Yes
Time controls	Yes
R^2	0.24
F-stat.	34.22
p value (F)	<0.00

N = 1.038. Standard errors in parentheses. All p values are two-tailed; *** coefficient is significant at the 0.01 level (two-tailed), ** coefficient is significant at the 0.05 level (two-tailed), * coefficient is significant at the 0.10 level

Variables definition: WO = firm's i reported goodwill write-offs for period t (reflected as a positive amount), divided by total assets at the end of period t − 1; E_{it} = firm's i average 3-year change in pre-write-off earnings from period t to t − 1, scaled by the totals assets at t − 1; OCF_{it} = firm's i average 3-year change in operating cash flows from period t to t − 1, scaled by the total assets at t − 1; $SALES_{it}$ = firm's i average 3-year change in sales from period t to t − 1; STOCKit = firm's i average 3-year change in the stock return period t to t − 1; MTB_{it} = firm's i market-to-book value at time t; LEV_{it} = leverage proxied by the liabilities to total assets ratio at time t; $SIZE_{it}$ = firm's i size, proxied by the total assets at time t

significant at the 1% level). The audit fees are significantly higher for firms underestimating the write-offs. The findings provide support for Hypothesis 2. Firms carrying inflated goodwill values and earnings are considered riskier by the auditors, which require higher fees. Table 5 shows that the audit fees (AUDFEES) have a negative significant association with the goodwill write-off overstatements (p value <0.05). The latter finding mirrors the former one. Anticipated write-offs and lower income provide more conservative reporting and reduce the risks to the auditors' reputation. In turn, the auditors reduce the fees. The findings support Hypothesis 3. Also, higher audit fees are poorly associated with more negative discretionary write-offs (p value <0.10). Overall, goodwill write-off understatement results in higher fees.

Table 4 First stage treatment effects regression of Model 1: Big-4 auditor selection dependent variable: Big-4

AUDFEES	11.417
	(33.134)
NAS	0.272
	(0.472)
TENURE	1.063**
	(0.539)
GTA	−0.507
	(0.593)
ROA	0.608**
	(0.259)
MTB	0.045***
	(0.016)
LEV	−0.425*
	(0.233)
SIZE	0.000***
	(0.000)
Const.	−4.446
	(1.798)
Industry controls	Yes
Time controls	Yes
Pseudo R^2	0.38
Log-likelihood	−156.65
LR $\chi^2(20)$	194.47
p value (χ^2)	<0.00

N = 1.038 Standard errors in parentheses. All p values are two-tailed; *** coefficient is significant at the 0.01 level (two-tailed), ** coefficient is significant at the 0.05 level (two-tailed), * coefficient is significant at the 0.10 level

Variable definition: $BIG4_{it}$ = dummy variable, 1 of the audit firm is a Big-4, 0 otherwise; $AUDFEES_{it}$ = audit fees on total assets for firm i at time t; NAS_{it} = percentage of non-audit fees on total fees for firm i at time t; $TENURE_{it}$ = 1 if the auditor tenure is 3 years or less, 2 if the auditor's tenure is between four and 9 years, 3 if the auditor's tenure is more than 10 years; GTA_{it} = goodwill on total assets; MTB_{it} = firm's i market-to-book value at time t; ROA_{it} = return on assets; LEV_{it} = leverage proxied by the liabilities to total assets ratio at time t; $SIZE_{it}$ = firm's i size, proxied by the total assets at time t

These findings can raise concerns about the goodwill fair value measurement, since the auditors' propensity for conservative accounting may be aligned with the managerial interest in using overestimated write-offs for earnings management reasons, e.g. to smooth the income or take big baths.

Table 5 shows that the non-audit fees (NAS) have a negative significant association with the goodwill write-off overstatements (p value <0.01). The findings suggest that firms that overstate the goodwill write-off pay lower non-audit fees. As mentioned above, the non-audit fees may include advice and consulting on business plans, forecasts and discount rates calculation. Firms using write-offs for earnings

Table 5 Second stage treatment effects model—OLS regression of Model 2

	Dependent variable: signed discretionary write-offs	Dependent variable: negative discretionary write-offs (absolute value)	Dependent variable: positive discretionary write-offs (absolute value)
BIG4	0.010	−0.016***	0.020
	(0.011)	(0.005)	(0.015)
AUDIT FEE	−0.000*	0.000***	−0.000**
	(0.000)	(0.000)	(0.000)
NAS	−0.043**	−0.004	−0.099***
	(0.020)	(0.009)	(0.036)
TENURE	−0.003	−0.007	−0.006
	(0.031)	(0.129)	(0.061)
MTB	−0.000	0.000	−0.000
	(0.000)	(0.000)	(0.001)
ROA	−0.086	0.012	−0.046**
	(0.014)	(0.009)	(0.021)
LEV	0.040***	−0.008*	0.002
	(0.007)	(0.004)	(0.012)
SIZE	0.000***	−0.000***	−0.008***
	(0.000)	(0.000)	(0.002)
MILLS	−0.020	0.012	−0.001
	(0.013)	(0.010)	(0.032)
Const	0.017	0.052	0.060
	(0.108)	(0.052)	(0.201)
Industry controls	Yes	Yes	Yes
Time controls	Yes	Yes	Yes
N	1038	700	338
Adj. R^2	0.26	0.32	0.25
F-stat.	7.73	25.45	5.05
p value (F)	<0.00	<0.00	<0.00

Standard error in parentheses. All p values are two-tailed; *** coefficient is significant at the 0.01 level (two-tailed), ** coefficient is significant at the 0.05 level (two-tailed), * coefficient is significant at the 0.10 level

Variable definition: $BIG4_{it}$ = dummy variable, 1 of the audit firm is a Big-4, 0 otherwise; $AUDFEES_{it}$ = audit fees on total assets for firm I at time t; NAS_{it} = percentage of non-audit fees on total fees for firm i at time t; $TENURE_{it}$ = 1 if the auditor tenure is 3 years or less, 2 if the auditor's tenure is between four and 9 years, 3 if the auditor's tenure is more than 10 years; MTB_{it} = firm's i market-to-book value at time t; ROA_{it} = return on assets; LEV_{it} = leverage proxied by the debt to total assets ratio at time t; $SIZE_{it}$ = firm's i size, proxied by the total assets at time t

management purposes may not seek advice from auditors. This result is also consistent with the finding on the significant and negative relation between audit fees and goodwill write-off overstatements. It is worth pointing out that the auditor

when judges the client less risky does not require additional audit fees nor does the auditor consider the provision of further non-audit services necessary for the "conservative" client. However, our evidence is not conclusive, as the non-audit fees have a negative but insignificant association with goodwill write-off understatements (Table 5). Thus, our findings do not fully support Hypothesis 4. In any case, the findings overall are not consistent with the notion that non-audit fees impair the auditor's independence and lead to lower quality financial reporting. As a matter of fact, we did not find a positive association with goodwill write-off overstatements or with understatements; this result contributes to the mixed literature and debate on auditor independence and non-audit fees (Cahan et al. 2008; Gul et al. 2007; Antle et al. 2006; Frankel et al. 2002). Overall, the non-audit fees are associated with negatively signed discretionary write-off (p value <0.05).

Our findings show that the auditor's tenure (TENURE) is associated with neither the signed discretionary goodwill write-off nor the goodwill write-off understatements and overstatements. Thus, there is no support for hypotheses 5a and 5b.

5.4 Robustness checks

We estimated the goodwill write-off understatements and overstatements by using the Tobit regression and the Heckman two-stage regression. The Tobit takes into account the distribution of the write-off variable, which is censored at zero since the US GAAPs prohibit the reversal of the goodwill write-off (Riedl 2004). The Heckman two-stage maximum likelihood ensures that our results are not driven by a self-selection bias, since we initially considered only impairing firms (Godfrey and Koh 2009). We obtained consistent results (not reported). Then, we re-run regressions in Table 5 using a stricter set of control variables, excluding the growth opportunities (MTB) and the firm profitability (ROA). We obtained consistent results. Finally, we run regressions in Table 5 using one explicative independent at time and keeping all the controls. Results are fully consistent with those of Model 2 for the positive absolute value of discretionary write-offs and partially consistent for the negative absolute value of discretionary write-offs (not significant but the coefficients' signs are not altered from the model with all the variables). We also re-perform regressions in Table 5 using as dependent variable the absolute value of discretionary write-offs and results are consistent with those regarding the signed discretionary write-offs (not reported).

5.5 Further investigations

We carried out further investigations to check whether the audit quality proxies are associated with the timing of the impairment. We regressed a dummy for the impairment (1 if there is an impairment, 0 otherwise) on our set of independent and control variables on the full sample of impairing and non-impairing firms. We made the same regressions using as dependent variables the lagged impairment at $t - 1$, t-2 and t-3, as well as the lead impairment $t + 1$, $t + 2$, $t + 3$. The findings (not reported) show that the large auditing firm proxy (BIG4) is associated with impairment at time t and in previous years but has no associations with future

impairment. This may support the notion that large auditors have a conservative approach and promote early impairments. Similarly, the audit fees are negatively associated with future impairments, so they are likely to be lower for companies who take early impairments. Finally, the non-audit fees seem to be higher for late impairers and lower for early impairers. Overall, the results are consistent with prior findings about discretionary write-offs.[8]

6 Discussion and conclusions

In this study we tested whether salient auditor characteristics (size, audit fees, non-audit fees, tenure) have an impact on goodwill write-off accounting. We find that the auditors' size, proxied by being part of the Big-4, constrains goodwill write-off understatements but does not affect goodwill write-off overstatements. This finding suggests that Big-4 auditors are more lenient with conservative estimates, which reduce their reputation and litigation costs. Big-4 auditors appear to be aware that reputation and litigation costs are high for late untimely large write-offs and low for anticipated conservative write-offs. This behaviour leads to acquiescence towards opportunistically anticipated write-offs made by managers for earnings management purposes. In the Big-4 perspective, such acquiescence in the management's representation may be helpful to maintain client harmony and safeguard the economic relationship while maintaining its reputation and litigation costs at an acceptable level.

Our study also provides evidence that auditors overall charge higher audit fees to clients underestimating the goodwill write-offs. Underestimated write-offs produce inflated goodwill values with higher probabilities of future late large write-offs. Such late adjustments to the goodwill value may cause damage to the auditors' reputations and trigger litigation. Auditors are cautious about optimistic underestimations of the goodwill write-offs and compensate for the greater audit risk by charging higher audit fees. By contrast, the findings show that goodwill write-off overstatements are associated with lower audit fees. Overstated write-offs result in more conservative assets and earnings estimates and reduce the reputation and litigation risks for auditors.

This paper can contribute to the academic literature on external auditor characteristics and financial accounting choices. We show how the auditors' preference for more conservative goodwill write-off accounting aligns with the managers' interest in anticipating write-offs for earnings management purposes. Besides being difficult to audit, the SFAS 142 fair value accounting provides incentives for auditors to deliver lenient audits.

Our study has practical implications. We highlight a major limitation of the goodwill write-off measurement under SFAS 142 (which is similar to the IAS/IFRS approach). Accounting regulatory authorities raised concerns about the use of inherently subjective fair value estimates and the audit's effectiveness on such estimates. Our study highlights the risk that leniently audited discretionary fair

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[8] We thank an anonymous reviewer for suggesting this analysis.

value estimates compromise the role of auditing (and of financial reporting) as an external control mechanism. To mitigate this risk, the standard setters could require more disclosure from the firm (e.g. methods used, time horizon, discount rates) and from the auditors (e.g. methods used to test the management's assumption, to identify the impairment indicators, sensitivity tests about discount rates, involvement of auditors with industry expertise). Finally, our study can provide arguments to the debate about the re-introduction of mandatory goodwill amortisation. Overall, our study can also contribute to the debate on accounting and auditing development in the European Union (Day and Taylor 2010).

We acknowledge some limitations of our study. We do not investigate the auditors' industry expertise, which might help deliver a more accurate audit on the goodwill write-off estimates. Also, we do not incorporate in our study proxies for the managerial compensation, which may shed further light on goodwill write-off accounting, as the management's compensation is a key driver of earnings management. We do not explore what happens during periods of economic crisis. Future research might explore crisis periods and goodwill accounting and examine whether the incentives of managers and auditors differ from those of non-crisis periods. Furthermore, future research might investigate whether auditor expertise in the client industry contributes to a more accurate audit on the estimation underlying goodwill write-offs. Another independent variable that might be explored is the auditor changes. Auditor changes have always drawn attention because they can be caused by managerial opportunism (Davidson et al. 2006; DeFond and Subramanyam 1998). On the one hand, management might decide to change the auditor to improve the firm's performance by reducing expenses or to obtain a more effective new auditor; on the other hand, it might change the auditor for opportunistic reasons, entrenchment of management, higher earnings, higher bonus compensation and "friendlier" audit opinions. If auditor changes were caused by opportunism, the level of discretionary accruals would be greater after the substitution. Consequently, with reference to goodwill write-offs, we might expect lower reliability after the change since the incoming auditor turns a blind eye to meet management objectives. For a thorough analysis, it would be interesting to investigate whether this expectation is exacerbated when the switch involves a large auditing firm. Future research might explore how managers select different earnings management tools to achieve their objectives (like working capital accruals, write-offs, provisions) and whether auditors have different behaviours towards different earnings management devices. In this sense, the present study may be further developed by introducing the resource-based-theory perspective. As a matter of fact, while most of the accounting and corporate governance literature is based on agency theory, our hypotheses may be grounded on resource-based theory (Stiles and Taylor 2002; Barney et al. 2001; Warnerfelt 1984; Barney 1991). The theory above predicts that firms' performances differ according to distinct resources, competences and know-hows managed by the same firms. Hence, it might be adapted to managers or auditors, which may be seen as resources that are capable of affecting the firm's financial reporting practices thanks to their knowledge, expertise, experience and skills.

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Silvia Ferramosca is a Post-Doc Research Fellow at the Department of Economics and Management, University of Pisa. Her research interests are focused on: financial accounting, international accounting standard IAS/IFRS, auditing, intellectual capital and corporate governance. She is author of recent studies on these topics published in the *Family Business Review*, in the *International Journal of Business Governance and Ethics* and in the *Journal of Learning and Intellectual Capital*.

Giulio Greco is Professor at the Department of Economy and Management, University of Pisa. He is Director of the Master in Business Administration. His research and teaching interests are in the fields of financial accounting, external auditing and corporate governance. Some of his recent works appeared in the *Journal of Management and Governance,* the *Managerial Auditing Journal*, *Local Government Studies* and *Corporate Communications*. He is active reviewer for several leading international academic journals.

Marco Allegrini, Ph.D., CPA is a Full Professor at the University of Pisa (Italy), where he is Co-ordinator of the Doctoral Programme in "Economia Aziendale and Management" (Business Administration and Management) and director of the MSc in Chief Financial Officer (CFO). He has published articles in journals including the *International Journal of Auditing*, *Journal of Management and Governance, Managerial Auditing Journal*, and *International Journal of Learning and Intellectual Capital*. He is active reviewer for several leading international academic journals.