Effect of Joint Auditor Pair Composition on Conservatism: Evidence from Impairment Tests

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ABSTRACT: Using a sample of firms from France, where the law requires use of two auditors, we examine the effect of auditor pair composition on overall measures of unconditional and conditional conservatism, as well as on a specific measure of conditional conservatism, i.e., impairment loss. We document that Big 4–non-Big 4 auditor pairs are more unconditionally and conditionally conservative, more likely to book impairments when operating performance is low, and likely to make more transparent impairment-related disclosures than Big 4–Big 4 auditor pairs. We argue that higher conservatism is mainly driven by higher auditor independence for the Big 4–non-Big 4 auditor pair, because unequal risk sharing in the Big 4–non-Big 4 auditor pair motivates the Big 4 auditor to maintain a high level of independence and enforce conservative accounting. Our results inform investors and firms in mandatory or voluntary joint audit regimes and regulators who are considering requiring joint audit to improve audit quality.

Keywords:

Joint Audit, Audit Quality, Auditor Independence, Conservatism, Impairment Testing

JEL Classifications: K22, G18, M42, M48, C72

1. Introduction

The recent financial crisis has led regulators and others to question whether audit firms lack "the requisite independence, expertise and incentives to construct the promised 'true' and 'fair' account of corporate affairs" (Sikka 2009, p. 868). As a result, regulatory authorities around the world have proposed solutions aimed at improving audit firms' ability to detect and prevent corporate bankruptcies, frauds and failures. The European Commission, in its Green Paper released in 2010, proposed the use of joint audits to improve audit quality and reduce audit market concentration. Similar initiatives have been proposed by regulatory authorities in the UK, India and China.

In this study, we examine the implications of auditor pair composition in a joint audit for audit quality. Joint audit refers to an audit in which two independent auditors audit the financial statements with shared audit effort, sign a single auditor's report, and bear joint liability in case of an audit failure (Ratzinger-Sakel, Audousset-Coulier, Kettunen, and Lesage 2012, p. 9). Joint audit is not double audit; rather, the two auditors work together on audit planning and allocate audit work and audit fees accordingly. They review each other's work and issue a single audit opinion. Joint audit has been implemented in several countries either on a mandatory or voluntary basis. In France, joint audit is mandatory for all companies preparing consolidated financial statements. Joint audit was mandatory in Denmark and South Africa, but now is voluntary. Joint audit is mandatory for a subgroup of firms in some countries. For example, India requires joint audit for state-owned enterprises and Saudi Arabia and Algeria mandate joint audit for banks.[1]

Although mandatory joint audit is not as prevalent around the world, it remains of considerable interest to both researchers and policy makers. At issue is whether joint audit can improve audit quality? DeAngelo (1981) defines audit quality as the market-assessed joint probability that a given auditor will both discover a breach in an accounting system and report the breach. In other words, audit quality is a function of the auditor's ability to detect material misstatements (auditor competence) and the auditor's willingness to report discovered material misstatements (auditor independence). Joint audit could positively affect both components of audit quality.

[1] Sweden and Canada required joint audit for banks but rescinded the requirement in 2006 and 1991, respectively.

Holding independence constant, a joint audit could increase the probability of detecting material misstatements because having another auditor review the work could increase the probability of detecting the problem. Advocates of joint audit also argue that joint audit benefits from complementarities of expertise and geographical coverage between the two auditors, and enhances dialogue leading to better solutions for problems in which judgment needs to be exercised (Mazars 2010).

Holding competence constant, joint audit could induce a higher level of auditor independence for the following reasons. First, it weakens the economic bonding between the auditor and the client because of fee sharing between the auditors (Mazars 2010; Zerni, Haapamäki, Järvinen, and Niemi 2012). Second, it reduces the risk of auditor manipulation by management because it might be more difficult for management to manipulate two auditors instead of one. As long as the benefits of taking corrective action exceed the costs for any one auditor, the problem will be reported and corrected (Zerni et al. 2012, p. 4). Third, it preserves knowledge resulting from staggered auditor appointments. Joint auditors usually rotate at different times, which will likely increase auditor independence while ensuring continuity by preserving the auditors' knowledge of the auditee (Carcello and Nagy 2004).

However, a joint audit may also negatively affect audit quality. First, a joint audit potentially entails high organization and coordination costs, which may lead to free riding by one or both members of the audit team. Second, inappropriate cooperation during the audit could lead to insufficient information exchange between the two auditors and *in fine* to lower audit quality (Neveling 2007). Third, as noted by Deng, Tong, Simunic, and Ye (2012), joint audit may result in internal opinion shopping by the client.

The empirical evidence on the effect of joint audit on audit quality confirms the mixed theoretical predictions. In 2004, when Denmark switched from a mandatory to a voluntary joint audit regime, only 24 percent of publicly traded firms in Denmark retained the joint audit structure, revealing a market preference for a single audit (Thinggaard and Kiertzner 2008). However, in the context of voluntary joint audits in Sweden, Zerni et al. (2012) find evidence that joint audit is associated with higher audit quality. In addition to comparing audit quality between joint audit and single audit, researchers also examine the effect of auditor pair composition on audit quality; however, the results are conflicting. For example, Francis, Richard, and Vanstraelen (2009) report that firms with two Big 4 auditors in France, where joint audit is mandatory, have smaller income-increasing abnormal accruals, whereas Marmousez (2009) documents that firms with two Big 4 auditors are less conservative in

reporting bad news. These conflicting results suggest that, in addition to the audit regime itself, the composition of the auditor pair in a joint audit may differentially affect audit quality.

Based on the preceding discussion, two important questions that can inform the debate on the implications of joint audit for audit quality are as follows: (1) Is audit quality higher with one or two auditors? (2) If a firm chooses two auditors, does audit quality depend on the mix of auditors selected (i.e., whether the firm uses two Big 4 auditors or one Big 4 and one non-Big 4 auditor, of two non-Big 4 auditors)? To answer the first question, we need to either compare joint audit firms and single audit firms in a voluntary joint audit regime or compare joint audit firms in a mandatory joint audit regime with single audit firms in a mandatory single audit regime. The first setting suffers from a severe self-selection problem.[2] In the second setting, it is difficult to effectively control for country level differences in economic, regulatory and institutional factors other than joint audit that may affect audit quality. In addition to research design difficulties, preliminary evidence on the impact of different auditor pairs on audit quality indicates that the overall effect of joint audit on audit quality may vary depending on the proportion of each auditor pair type (i.e., Big 4–Big 4, Big 4–non-Big 4, non-Big 4–non-Big 4) in the sample. As a result, understanding the implications auditor pair composition for the effect of joint audit on audit quality can potentially explain the mixed empirical results of studies that compare joint audit and single audit. Since the two exploratory studies on the second question yield contradictory results, there is much room for study in this area. Thus, we focus on the second question in this paper.

Understanding the effect of auditor pair type on audit quality is also important to regulators, investors and firms. First, it would be informative to policy makers to know whether a particular auditor pair type results in superior audit quality. Second, one important reason for the European Union favoring joint audits is that it is a way to reduce audit market concentration by allowing non-Big 4 firms to pair with Big 4 firms and thus to play a larger role in the audit market. However, it is unclear whether the benefit of such diversification on market concentration would be lost if audit quality is lower for the pair of one Big 4 and one non-Big 4 auditors. Our study provides empirical evidence on the effect of different auditor

[2] In the case of voluntary joint audit, self-selection increases the probability of finding higher audit quality for firms that chose two auditors versus for firms that chose only one auditor (Zerni et al. 2012). Although we also face a self-selection problem in the case of auditor pair choice, we show in a sensitivity test that self-selection works against finding our hypothesized results. In fact, we find stronger results after controlling for self-selection.

pairs on audit quality. Third, whether different auditor pairs provide differential audit quality is relevant to firms and investors in both a mandatory and a voluntary joint audit regime. When firms' audit committees decide which auditor pairs to hire or when investors evaluate company's audit quality, the impact of auditor pair type should be an important consideration.

We investigate this question in France, where the regulatory setting presents a unique opportunity for assessing the effectiveness of different auditor pairs, as publicly listed companies preparing consolidated financial statements have been required to be audited by (at least) two unrelated auditors since 1966. In the French audit market, we observe a variety of auditor pairs including Big 4–Big 4, Big 4–non-Big 4, and non-Big 4–non-Big 4. Audit quality may differ across auditor pairs because the interactions between different auditors are likely to alter both the competence and the independence dimensions of audit quality.

On the one hand, auditor competence could be higher for the pair of two Big 4 auditors because Big 4 auditors are generally believed to possess more experience and expertise. On the other hand, auditor independence could be higher for the pair of one Big 4 and one non-Big 4 auditors due to unequal risk sharing. The Big 4 auditor in such a pair bears a disproportionate share of the reputation and litigation costs, and thus has stronger incentives to maintain higher audit quality. By contrast, because the reputation and litigation costs are equally shared between them, a Big 4 auditor in a Big 4–Big 4 pair may have relatively weaker incentives to maintain higher audit quality. As a result, although the Big 4–non-Big 4 pair may have lower auditor competence, it may have higher auditor independence than the Big 4–Big 4 auditor pair. Thus, the overall effect of auditor pair composition on audit quality is unclear and remains an empirical question.

Auditors, through their monitoring role, influence the outcome of financial reporting by firms. Better monitoring translates into higher audit quality and higher financial reporting quality, which can be measured by the extent of earnings management, likelihood of bankruptcy or restatements, and degree of conservatism in financial reporting. In this study, we first assess the implications of auditor pair composition for audit quality using general measures of unconditional and conditional conservatism, and then supplement these analyses with a procedure-specific measure of conservatism, namely impairment tests. Conservatism is considered a key qualitative attribute of financial reporting (Watts 2003; Francis, LaFond, Olsson, and Schipper 2004; Francis, Olsson, and Schipper 2006; Ball, Robin, and Sadka 2008; Dechow, Ge, and Schrand 2010; Kothari, Ramanna, and Skinner 2010).

Under both international accounting standards and US GAAP, impairment tests are crucial to guarantee timely loss recognition (Kim, Lee, and Yoon 2013; Amiraslani, Latridis, and Pope 2013), as impairment tests ensure that assets are not carried at more than their economic value (also referred to as 'recoverable value' (IAS 36 § 1). International Financial Reporting Standards, applicable in France since 2005, require that an impairment loss be recognized whenever the recoverable amount is below the carrying amount (IAS 36 § 59). The implementation of impairment tests usually relies on valuation models, requires "significant judgment" from managers (Petersen and Plenborg 2010, p. 420), and is prone to manipulation by managers because it relies on unverifiable fair value estimates (Hayn and Hughes 2006; Ramanna 2008; Bens, Heltzer, and Segal 2011; Li and Sloan 2011; Ramanna and Watts 2012). Disclosures of the subjective valuation assumptions used in impairment tests also vary widely (ESMA 2013; Amiraslani et al. 2013). Consequently, the role of auditors in maintaining objectivity and transparency of impairment tests and taking corrective action to ensure that firms recognize economic impairments when they occur is more pronounced.

Focusing on the relation between auditor pair composition and impairment of goodwill and other intangible assets with indefinite useful life[3] has several advantages over studying the corresponding relations between more general measures of unconditional and conditional conservatism. First, general unconditional and conditional conservatism measures such as market-to-book ratio and the Basu (1997) asymmetric timeliness measure are affected by many factors that are difficult to properly control. Focusing on a specific account can potentially offer sharper and more powerful tests of the effect of auditor pair composition. Second, impairment tests play a key role in ensuring timely loss recognition and hence conservatism. Examining the impairment accounts allows us to observe the underlying mechanism through which auditor pairs affect conservatism. Third, the impairment account is more prone to manipulation due to the subjectivity associated with estimating fair values. Several professional reports and the press recently signaled a lack of objectivity of impairment tests for goodwill.[4] If auditor pair composition has an effect on accounting quality, this effect should be most noticeable in an account such as impairment where the

[3] Since goodwill represents the bulk of intangibles with indefinite useful life, for brevity we use 'goodwill' for 'goodwill and other intangibles with indefinite useful life'.

[4] See (1) Ernst & Young (2010) 'Meeting today's financial challenges – Impairment reporting: Improving stakeholder confidence'; (2) Houlihan Lokey (2013) 'The European Goodwill Impairment Study 2012-2013'; and (3) Tata Steel – Goodwill Hunting, May 14th, 2013 on the website of The Economist. Available at: http://www.economist.com/news/business/21578082-what-corus-write-reveals-goodwill-hunting

auditor's role in monitoring management behavior is important. Fourth, the impairment account is usually economically significant because it is related to a public firm's largest individual asset for which a "fair value" estimate is required, i.e., goodwill.[5] Fifth, transparency of impairment-related disclosures allows us to infer the effects of auditor independence. Since the disclosure requirements are clearly delineated in accounting standards, whether or not to require such disclosures will, to a large degree, depend on auditor independence.

We conduct our empirical analysis on a sample consisting of all non-financial French firms included in the SBF 120 index (the 120 largest market cap firms listed on the Paris Bourse) over the period 2006 to 2009. We document the following results. First, firms audited by a Big 4–non-Big 4 auditor pair exhibit a higher degree of unconditional conservatism, proxied by (growth-adjusted) market-to-book ratio. Second, firms audited by a Big 4–non-Big 4 auditor pair exhibit a higher degree of conditional conservatism, proxied by the Basu (1997) measure. Third, firms audited by a Big 4–non-Big 4 auditor pair are more likely to impair assets when performance is low. Fourth, firms audited by a Big 4–non-Big 4 auditor pair have more transparent impairment-related disclosures when performance is poor. Overall, our results indicate higher levels of conservatism for firms audited by a Big 4–non-Big 4 auditor pair than for firms audited by a Big 4–Big 4 auditor pair. These results are consistent with better audit quality for the Big 4–non-Big 4 auditor pair. They also indirectly suggest that auditor independence plays a more prominent role than auditor competence in explaining the observed difference in level of conservatism across different auditor pairs.

We make several contributions to the literature. First, we provide evidence that deepens our understanding of the consequences of the joint audit requirement for audit quality. We challenge the common belief that two Big 4 auditors necessarily improve financial statement quality. Our findings are relevant to the debate on audit reforms being considered by policy makers around the world in their efforts to improve audit quality. Our study is also relevant for countries where joint audits are voluntary (Algeria, Denmark, South-Africa, Sweden), mandatory for specific sectors such as the financial sector (Algeria, Saudi Arabia), state-owned enterprises (India), or mandatory for all sectors (Congo, France, Kuwait, Lebanon, Morocco, the Ivory Coast, and Tunisia).[6] Second, we demonstrate that interactions between joint auditors have important implications for audit quality. Specifically, risk sharing between

[5] From 2006 to 2009, goodwill represents on average 27% of total assets of the 120 French largest listed firms (SBF 120) comprising our sample and all firms had carrying goodwill on their balance sheet.
[6] See Ratzinger-Sakel et al. (2012).

joint auditors can have a significant impact on auditor independence and hence on audit quality. Third, by focusing on a specific account, impairment, we are able to shed light on the underlying mechanisms through which auditor pair types affect financial reporting quality. Fourth, using the transparency test for impairment-related disclosures, we attempt to separate the effect of auditor independence from that of auditor competence and show that Big 4–non-Big 4 auditor pairs are more independent than Big 4–Big 4 auditor pairs.

The remainder of this paper is organized as follows. We provide a description of the audit market in France in section 2, review the related literature in section 3, and develop the hypotheses in section 4. We describe the sample selection and research design in section 5, report our results in section 6, discuss self-selection issues in section 7, and conclude the study in section 8.

2. The audit market in France

Since 1966, public firms in France are required to be audited by (at least) two distinct auditors that share the audit process. Although threatened by the European regulation introducing consolidated financial reporting in 1984, this joint audit requirement was reiterated by the 2003 French Financial Security Law that followed the Enron scandal.[7] Auditors have a six-year mandate and face (for mandates of listed firms) a compulsory (partner) rotation after each mandate if the same audit firm is retained. Joint auditors are appointed by shareholders through a resolution at the general meeting. There is no legal requirement for both auditors to be appointed at the same time, i.e., audit firms may be subject to tender at different times (staggered appointments) or at the same time (simultaneous appointments). French Financial Security Law also requires that each joint auditor verifies the work undertaken by the other auditor, leading to the joint audit report. Therefore, the joint audit is not a double audit where each auditor duplicates its counterpart's work. Instead, joint auditors must sign a single audit report, i.e., agree on the same report independently, and are legally jointly liable for the issued audit opinion. However, as indicated earlier, the actual liability may be different from the legal rule as regulators are likely to differentially treat large and small audit firms.

Joint auditors share the workload and associated fees in conducting the audit process according to quantitative criteria (e.g., number of estimated hours) and qualitative criteria

[7] French Financial Security Law (2003). 'Loi No 2003-706 du 1 août 2003 de sécurité financière, version consolidée au 1er avril 2006', available at http://www.legifrance.gouv.fr. Francis et al. (2009, p. 38) also provides specifics of the audit market in France.

(e.g., expertise required, geographical network of firms). The planning of the audit is generally done by the two auditors and covers three phases: (1) the audit of consolidated subsidiaries, (2) the audit of parent company's accounts, (3) the audit of consolidation process and of published financial information. The division of work between joint auditors is different for these three phases. It is generally divided based on business, product or geographical location for the audit of consolidated subsidiaries. The division of work for the audit of the parent company is generally based on audit cycles (e.g., production/inventory management, purchases/payables, or tax, IT and human resources for corporate functions). Lastly, the division of audit work for the consolidation process and published financial information is based either by topic (e.g., deferred taxes, finance lease entries, statement of changes in equity, goodwill impairment tests), by business, or by geographical zones. This last phase may be mainly performed by only one auditor (Mazars 2010).

According to the applicable French auditing standard (NEP 100), the workload (and fees) should be split between the two auditors on a balanced basis. The objective is to split fees so that auditors receive between 40% and 60% of audit fees. In practice, small auditors sharing a joint audit mandate with a Big 4 auditor often receive a much smaller fraction of fees, suggesting that they do not complete a critical part of the audit, and most likely bear lower risks than Big 4 auditors. Such unequal sharing of audit fees led the French oversight board of auditors to express some concerns in 2012.[8] Furthermore, impairment tests for goodwill require a relatively higher level of expertise in valuation that Big 4 auditors, relying on larger 'transaction services' teams, are likely to be able to draw on.

Joint audit is being considered by the European Commission as an option to restore confidence in the financial statements of companies after the 2008 financial crisis, and also as a way to decrease audit market concentration. As Michel Barnier, Internal Market and Services Commissioner, explains "[The European Commission]'s proposals[9] address the current weaknesses in the EU audit market, by eliminating conflicts of interest, ensuring independence and robust supervision, and by facilitating more diversity in what is an overly concentrated market, especially at the top-end." One of the European Commission's main arguments favoring joint audit is that it will facilitate the emergence of new 'Big' audit firms, in particular by promoting Big 4–non-Big 4 auditor pairs.

[8] In February 2012, the oversight board of the legal audit in France (the "Haut Conseil du Commissariat aux Comptes" also called "H3C") published a report criticizing this unequal sharing of work between joint auditors. The H3C urged audit firms to share the audit work equally. See http://www.h3c.org/textes/Avis%202012-01.pdf

[9] (European Commission 2011a, 2011b)

France has the lowest audit market concentration among G8 countries, with Big 4 auditors earning only 61% of total market revenues in 2007 compared to 91% for the other G8 countries.[10] One consequence of the joint audit rule is that, even if the Big 4 dominate the audit market, smaller audit firms also play a significant role in the audit market. Indeed, 55% of our sample that spans the 2006-2009 period and represents the 120 largest non-financial firms by market cap, were audited by at least one non-Big 4 auditor.[11] Non-Big 4 auditors can be classified into two sub-groups: (1) Tier-one non-Big 4 auditors, which have considerable revenues, more than one listed-firm client, and belong to an international network, e.g., Mazars, Grant Thornton and BDO, and (2) Tier-two non-Big 4 auditors, which have considerably smaller revenues, usually only one listed firm client, and are mainly local French auditors, e.g., AEG Finance, Cofirec, Dauge & Associés, Didier Kling & Associés. There are relatively few joint auditor pairs comprised only of Tier-one and/or Tier-two non-Big 4 auditors.

3. Overview of related literature

Research attempting to model the joint audit is scarce. An exception is Deng et al. (2012), who develop a model that compares three regimes -- a Single Big-Firm Auditor (regime B), Two Big-Firm Auditors (regime BB), and One Big-Firm Auditor paired with one Small-Firm Auditor (regime BS) -- to assess the effect of joint audit on audit fees, audit evidence precision, and auditor independence. Their results indicate that audit evidence precision is the same for regimes B and BB, but lower for regime BS, as the small audit firm free rides on the big firm. In addition, joint audit lowers auditor independence for both regimes BB and BS. Although buying off two auditors is more expensive under joint audit, joint audits provide companies with an opportunity to internally shop for a favorable audit opinion from the two auditors and thus lead to a higher level of *ex post* earnings management. In terms of audit fees, the BB regime would result in lower audit fees than the B regime because of the convexity of the resource cost function (i.e., one audit firm doing all the work under a completion time constraint may experience a higher cost than if the work was split between two firms). The audit fee for the BS regime would be lower than under the B regime only if the big firm and the small firm have similar technological efficiency or if the big firm bears a sufficiently large proportion of misstatement cost. In general, the results indicate that, in

[10] http://www.gti.org/Press-room/Press-archive/2007/G8-audit-concentration.asp
[11] See the descriptive statistics in Table 2, Panel B.

contrast to the common view, joint audit does not necessarily improve auditor competence or independence due to free-riding and internal opinion shopping. Audit fees are also not necessarily higher when compared to single audit.

Empirical evidence comparing the performance of joint audit and single audit also is limited, with most studies examining the effect of voluntary joint audit. For example, Zerni et al. (2012) study the impact of voluntary joint audit on audit quality in Sweden. While controlling for differences in characteristics between firms voluntarily choosing joint audits and other firms, the authors demonstrate that joint audits improve audit quality. Using a sample of approximately 900 firm-year observations, Zerni et al. (2012) show that firms using joint audit have higher conservatism as measured by the asymmetric timeliness coefficient, lower income-increasing abnormal accruals, higher credit ratings, and lower perceived risk of bankruptcy. However, audit fees are significantly higher for joint audit firms. Our study differs from Zerni et al. (2012) in terms of both research objective and context. We focus on the consequences of auditor pair composition on audit quality in a mandatory joint audit context.

Lesage, Ratzinger-Sakel, and Kettunen (2011) test the impact of joint audit on both audit cost and audit quality in Denmark (2005-2009), which rescinded the mandatory joint audit requirement in 2005. They find that firms continuing to use joint audit after the 2005 regulation change have significantly higher audit fees compared with firms voluntarily choosing to use a single auditor, but no difference in total fees. In addition, audit quality, proxied by abnormal accruals, is not significantly different for the joint and single audit firms.

André, Broye, Pong, and Schatt (2013) examine the impact of mandatory joint audit on both audit costs and audit quality across different countries. They compare audit fees paid by French listed firms under the mandatory joint audit regime to audit fees paid by Italian and British firms under the single audit regime. Their findings indicate higher audit fees in France after controlling for auditor, client and engagement attributes. Using abnormal accruals, they do not find significantly higher audit quality under the joint audit regime.

The mixed empirical evidence above suggests that the general effect of joint audit on audit quality remains unclear. In an effort to better understand the implications of joint audit for audit quality, a few papers study the effect of auditor pair composition on audit quality. For example, Francis et al. (2009) analyze the consequences of France's joint audit requirement on earnings quality for a sample of 261 firm-year observations and find that firms

with two Big 4 auditors exhibit the lowest income-increasing abnormal accruals, followed by firms with a Big 4 auditor paired with a non-Big 4 auditor, and firms with two non-Big 4 auditors. Francis et al. (2009) conclude that a pecking order exists with regard to earnings quality and auditor-pair choice.

By contrast, Chihi and Mhirsi (2013), also using abnormal accruals to measure audit quality, do not find evidence supporting Francis et al.'s pecking order explanation. Using a sample of 891 observations from France, they report that the pair of one Big 4 and one non-Big 4 auditor is associated with lower signed abnormal accruals compared with the pair of two Big 4 auditors. Their study also examines the effect of staggered vs. simultaneous auditor appointments on abnormal accruals and concludes that staggered (partner) tenures are associated with lower abnormal accruals.

Marmousez (2009) examines the effect of auditor pair type on audit quality, using the Basu's (1997) measure of conservatism. She studies conservatism because it is a desirable feature of accounting that helps auditors avoid litigation cost and reputation loss. Based on a sample of 177 firms in 2003, Marmousez (2009) finds that firms audited by Big 4–Big 4 auditor pairs do not exhibit conditional conservatism whereas firms audited by Big 4–non-Big 4 auditor pairs do. According to Marmousez (2009), the rationale for these results is that interactions between Big 4 auditors are less efficient and reduce incentives to provide an adequate effort for Big 4 pairs. Our study adds to this exploratory work in three ways. First, by using a longer time-period, we test the effect of auditor pair composition on unconditional conservatism and timely impairment loss recognition in addition to conditional conservatism, and find consistent results. Second, by analyzing the effect of auditor pair type on auditor competence and independence, we attempt to provide a stronger theoretical reason for the results. We argue that due to unequal risk sharing, the Big 4–non-Big 4 auditor pair has higher independence, which manifests in higher client conservatism compared with the Big 4–Big 4 pair. Third, using self-constructed transparency measures for impairment-related disclosures, we attempt to test the auditor independence argument.

We complement prior research by focusing on accounting procedures that are essential to achieve conservatism but likely to be manipulated by managers, i.e., impairment tests. Impairments of assets are typically perceived as a negative asset pricing signal by market participants (Fields, Lys, and Vincent 2001), which provides a strong incentive for firms to avoid booking or delaying their recognition. There are also other incentives for managers to avoid or delay impairment recognition, including debt and compensation contracts (Watts and

Zimmerman 1986) and management reputation (Francis, Hanna, and Vincent 1996). These incentives, along with the increased flexibility afforded managers by recent accounting standards (i.e., IAS 36 (IASB 2004) internationally and FAS 142 (FASB 2001) in the US) explain Li and Sloan (2011) and Ramanna and Watts (2012) findings of a high degree of manipulation by managers of asset impairments. Hayn and Hughes (2006) document a time lag of three to four years between the deterioration in the performance of the acquired business that gave rise to goodwill and the actual recognition of goodwill impairment. Kim et al. (2013), controlling for an increase in conservatism that is not attributable to new goodwill accounting under FAS 142, find that accounting earnings for firms with purchased goodwill become less conservative after the adoption of FAS 142. Petersen and Plenborg (2010), using a survey on 58 firms listed on the Copenhagen Stock Exchange, identify numerous areas of non-compliance with IAS 36 "Impairment of assets" for these firms and show that "practice varies considerably among firms" (p. 421). The authors also stress that "IAS 36 is a standard that involves substantial judgment" (p. 420). The European Securities and Market Authority (ESMA) also recently expressed concern about insufficient impairment recognition and disclosures by major listed European companies during the financial crisis, stating that "Although the major disclosures related to goodwill impairment testing were generally included, in many cases these were of a boiler plate nature and not entity-specific"(ESMA 2013, p. 3). The financial and sovereign debt crisis experienced by European firms since the summer of 2007 offers an excellent setting for examining impairment tests, since economic impairments were frequent over the period. External auditors play a key role in maintaining the objectivity and fairness of impairment tests, particularly with regard to their accuracy and transparency (Petersen and Plenborg 2010, p. 419).

4. Hypotheses

Our objective is to examine how the types of auditors in the pair affect audit quality. Since the characteristics of the auditors in the pair dictate their incentives, cost-benefit analysis and ultimate actions, we need to analyze the effects of auditor type to understand the audit quality implications of joint audit. A considerable amount of the audit literature distinguishes between Big 4 and non-Big 4 auditors for at least the following two reasons. First, auditor size is viewed as a proxy for audit quality because lower economic reliance on any single client makes larger audit firms less likely to behave opportunistically to retain the client (DeAngelo 1981). Second, larger firms may have greater reputations to protect (Dopuch and Simunic

1980). The empirical audit literature supports this notion and Big 4 auditors generally score higher on various audit quality proxies than non-Big 4 auditors (Palmrose 1988; Becker, Defond, Jiambalvo, and Subramanyam 1998; Khurana and Raman 2004; Behn, Jong-Hag, and Kang 2008). However, whether pairing two Big 4 auditors together would result in better audit quality than pairing one Big 4 with one non-Big 4 auditor is unclear.

From the competence perspective, if we consider Big 4 auditors as more competent, the pair of two Big 4 auditors will possess higher overall competence than the pair of one Big 4 and one non-Big 4 auditor. Moreover, Deng et al. (2012) show that the small auditor is likely to free ride on the big auditor when its level of technological competence is significantly lower. Thus, if the non-Big 4 auditor shirks, the competence level of the Big 4–non-Big 4 auditor pair will be further reduced. However, one may argue that the competence of a single Big 4 auditor is already sufficient to ensure the requisite level of audit quality and thus the difference in competence between the two types of auditor pairs may not manifest in different quality. If this is the case, whether there is a difference in audit quality will instead depend on auditor independence.

Auditor independence determines whether a discovered breach will be reported or corrected. We argue that due to unequal risk sharing, the pair of one Big 4 and one non-Big 4 auditors can deliver higher auditor independence than the pair of two Big 4 auditors. The risk here mainly refers to the potential litigation cost and reputation loss when outsiders other than the auditor discover or report the inappropriate financial reporting. For the pair of two Big 4 auditors, the costs will be approximately equally shared by the two auditors because each has deep pockets and a strong reputation to protect. As a result, the two Big 4 auditors may over-rely on each other and neither will report the breach in the end, leading to the typical prisoner's dilemma result. For the Big 4–non-Big 4 auditor pair, however, the Big 4 auditor bears most, if not all, of the litigation and reputation costs. In a noteworthy legal case in 2007, the French securities regulator (AMF)[12] found evidence of misstatements in the financials of the company, Marionnaud, for the period 2002-2004. Marionnaud was audited by a Big 4–non-Big 4 pair consisting of KPMG and Cofirec. However, the AMF held KPMG responsible for the misstatements, claiming that the small auditor "had neither the resources nor the ability" to detect the irregularities in its cross review.[13] The disproportionately high risk borne

[12]The AMF ('Autorité des marchés financiers' – 'Financial Market Authority') is the French equivalent of the SEC.

[13]In a decision dated July 5, 2007 by the AMF, KPMG and the partner responsible for the Marionnaud account for KPMG were respectively sentenced to pay €100,000 and €40,000 of financial penalties. Cofirec and its

by a Big 4 auditor when paired with a small auditor creates stronger incentives for the Big 4 auditor to enforce appropriate financial reporting.

The above arguments and anecdotal evidence suggest that the pair of two Big 4 auditors may exhibit higher auditor competence but lower auditor independence than the pair of Big 4–non-Big 4 auditors. As a result, the effect on audit quality will depend on whether auditor competence or auditor independence dominates. Empirical evidence on the effect of auditor pair type on audit quality is limited and the results are inconsistent. For example, Francis et al. (2009) find that the pair of two Big 4 auditors is associated with the lowest level of income-increasing abnormal accruals, whereas Chihi and Mhirsi (2013) find that the pair of one Big 4 and one non-Big 4 auditor is associated with lower signed abnormal accruals compared with the pair of two Big 4 auditors. Additionally, Marmousez (2009) reports that financial statements audited by one Big 4 and one non-Big 4 auditor are more conditionally conservative than those audited by two Big 4 auditors. Given the uncertain theoretical prediction and contradictory empirical results, we state hypothesis 1 in null form as follows:

H1: Audit quality is not significantly different across auditor pair types.

We first proxy audit quality by using general measures of conservatism, including growth-adjusted market-to-book ratio for unconditional conservatism and the Basu asymmetric timeliness measure for conditional conservatism. Additionally, we examine the effect of auditor pair type on a specific account, impairment of goodwill and other intangible assets with indefinite useful life. Under IFRS, purchased goodwill is not amortized but tested for impairment at least annually. Because it is difficult to accurately assess the value of goodwill separately, the impairment test relies on a subjective valuation of groups of assets to which goodwill has been allocated. The valuation of these groups of assets (recoverable value) is then compared to the carrying amount of goodwill in the balance sheet. The valuation involves discounting future cash flows that are forecasted based on current cash flow and valuation assumptions (e.g., growth, profitability, risk). If current performance is low management will have to use unrealistic valuation assumptions (e.g., higher growth rate than can be expected given the business environment, lower discount rate given the risk) to avoid impairing goodwill.[14] We focus on the impairment account because it is significant and more prone to manipulation by managers. The independence of external auditors is important

partner were cleared by the AMF and were not required to pay anything. KPMG may have been required to pay additional civil penalties.

[14] See ESMA (2013) for a discussion of unrealistic valuation assumptions.

to maintain the objectivity and fairness of impairment tests (Petersen and Plenborg 2010, p. 419). As a result, if auditor pairs have any effect on audit quality, this effect should be most pronounced in an account such as impairment.

For the impairment test, we first examine the timeliness of impairment loss recognition. According to IAS 36, *Impairment of Assets*, goodwill and intangible assets with indefinite life should be tested annually for impairment. To test for impairment, goodwill must be allocated to each (or groups of) cash generating unit(s) based on the lowest level within the firm at which the goodwill is monitored for internal management purposes. The recoverable amount of the unit to which goodwill is allocated should be compared with the carrying amount of that unit. If the carrying amount exceeds the recoverable amount, an impairment loss must be recognized. The recoverable amount is the higher of an asset's fair value less costs of disposal and its value-in-use. For the goodwill impairment test, the recoverable amount usually refers to the value-in-use calculated by discounting future cash flows expected to be derived from the cash generating unit to which goodwill is allocated.

Management has considerable discretion in projecting future cash flows and choosing discount rates. IAS 36 requires that management make cash flow projections based on reasonable and supportable assumptions and assess the reasonableness of those projections by comparing projected cash flows and actual cash flows. As a result, past performance should be a primary benchmark when estimating the recoverable amount of the unit. In fact, poor economic performance is listed as one of the indicators for impairment in IAS 36. Based on the above reasoning, we expect that when a firm reports low performance, it is more likely that an economic impairment needs to be booked. Hence, we test whether the probability of impairment recognition differs across auditor pair types for firms with low performance. Holding other things equal, a higher probability of booking an impairment under poor performance indicates higher auditor quality.

Next, we examine the transparency of impairment-related disclosures. International accounting standards include specific disclosure requirements for goodwill impairment tests. Irrespective of whether a goodwill impairment is recognized, the firm must disclose certain information related to the estimates used to measure the recoverable amounts of cash generating units containing goodwill. Major disclosures include the carrying amount of goodwill assigned to each unit, how the firm estimates the recoverable amount of the unit, key assumptions and approaches that management used to make cash flow projections, growth rates used to extrapolate beyond the cash flow forecast period, discount rates, etc. Not all

French listed firms provide all the required disclosures and the level of disclosure transparency varies significantly across firms in Europe (ESMA 2013). When economic conditions (i.e., low performance) suggest that impairment is likely, managers intending to manipulate the impairment tests and delay impairment recognition will have incentives to provide less detailed disclosures regarding the procedures used in the impairment tests, and thus make it more difficult for outsiders to assess the appropriateness of the impairment recognition. As a result, we use the algebraic difference in impairment disclosure transparency between firms with low and high operating performance as a proxy for transparency manipulation by management. The more negative the algebraic difference between firms with low and high operating performance, the more likely are the firms to reduce their disclosure when the likelihood of an economic impairment is high, and hence the more the transparency manipulation that is likely to have taken place. Auditors play a key role in preventing such manipulation of impairment disclosures by management. When auditors examine the impairment accounts, they can urge firms to disclose more information, allowing outsiders to better assess the reasonableness of management's procedures and key assumptions. Thus less transparency manipulation can be viewed as an indication of higher audit quality. Moreover, given that the disclosure requirements are specified in accounting standards, it is difficult to argue that an auditor does not ask management to provide the required disclosures due to lack of competence. Thus, whether or not auditors push the firm to make the required disclosures and prevent firms from doing transparency manipulation should mainly depend on their independence level. As a result, the audit quality measure using the transparency proxy likely reflects the effect of auditor independence.

Based on this reasoning, we test the following four sub-hypotheses:

H1a: Unconditional conservatism is not significantly different across auditor pair type.

H1b: Conditional conservatism is not significantly different across auditor pair type.

H1c: The probability of booking an impairment when performance is poor is not significantly different across auditor pair type.

H1d: The (algebraic) difference in impairment disclosure transparency between firms with low and high performance is not significantly different across auditor pair type.

5. Sample Selection and Research Design

Sample Selection

Our sample includes firms from the 120 listed firms comprising the SBF 120 index, and spans the period 2006 – 2009. These firms represent large firms (included in the French CAC 40 index) and mid cap firms (the next 80 firms). We delete 10 financial firms because they are required to follow industry-specific impairment rules and disclosures. Only two of the remaining 110 firms are audited by a pair of two non-Big 4 auditors. We delete these two firms because of the small sample size for this subset of firms. Therefore, we study only firms audited by either Big 4–Big 4 or Big 4–non-Big 4 auditor pairs. Due to missing variables for some firms, our final sample comprises 91 firms representing 316 firm-year observations. We winsorize each continuous variable at its first and ninety-ninth percentiles to reduce the effects of extreme values.

Auditor Pair Type and Unconditional and Conditional Conservatism

We test the relation between auditor pair type and conservatism using established measures of unconditional and conditional conservatism. Unconditional conservatism (also known as *ex ante* or news-independent conservatism) results from (continually) understating the book value of net assets relative to their economic value. This form of conservatism, which is an accounting bias toward reporting low earnings and book value of stockholders equity, leads to higher (internally generated) goodwill and higher market-to-book ratio. Unconditional conservatism is a primary (though not the sole) source of unrecorded goodwill, which also includes the present value of expected economic profits (from rents or growth). Empirical proxies for unconditional conservatism used in the literature are theoretically based on the Ohlson (1995) residual income model. Roychowdhury and Watts (2007) and García Lara and Mora (2004) use the market-to-book ratio to proxy for unconditional conservatism. Roychowdhury and Watts (2007) argue that the market-to-book ratio is influenced by two factors: (1) the unverifiable (unbooked) increases in value of separable assets in place (true unconditional conservatism), and (2) the expected value of economic profits (e.g., synergies between assets in place, growth, rents). We isolate the first factor by controlling for the second factor using variables such as asset intangibility, firm growth potential, current performance, risk and volatility, and investment activity. We estimate the following model adapted from Piot, Dumontier, and Janin (2011):

$$MtoB_t = b_0 + b_1 Big4\_Small_t + b_2 \Delta Sales_t + b_3 Return_t + b_4 Perf_t + b_5 GW_t + b_6 PPE_t + b_7 Capex_t + \varepsilon_t \quad (1)$$

where:

- *MtoB* = market-to-book ratio of equity (Datastream);
- *Big4_Small* = 1 if one of the two external auditors is a Big 4 auditor and the other is not (Annual report), and zero if both external auditors are Big 4 auditors;
- *ΔSales* =percentage change in total sales (Datastream);
- *Return* = share return computed over the fiscal year (Datastream);
- *Perf* = EBITDA divided by total assets (Datastream);
- *GW* = goodwill divided by total assets (Datastream);
- *PPE* = property, plant and equipment divided by total assets (Datastream);
- *Capex* = capital expenditures divided by total assets (Datastream).

To test H1a, we examine whether firms with a Big 4–non-Big 4 auditor pair have higher market-to-book ratio, which implies that book value is more understated, than firms audited by a Big 4–Big 4 auditor pair. We expect sales growth, performance, capital expenditures and share return, which capture expected growth, to be positively related to market-to-book ratio. The percentage of total assets comprised of goodwill and property, plant and equipment reflects the intangibility of the business.[15]

Conditional conservatism (also known as *ex post* or news-dependent conservatism) results from writing down book values and decreasing income under sufficiently adverse circumstances, and not writing up those values when circumstances are favorable. We use the following model, adapted from Basu's (1997) piecewise linear asymmetric timeliness model, to estimate the effects of different auditor pairs:

$$X_t = b_0 + b_1 BN_t + b_2 R_t + b_3 BN * R_t + b_4 Big4\_Small_t + b_5 Big4\_Small * BN_t + b_6 Big4\_Small * R_t + b_7 Big4\_Small * BN * R_t + b_8 Size_t + b_9 Leverage_t + b_{10} Risk_t + \varepsilon_t \quad (2)$$

where:

- *R* = Share return measured from 9 months prior to fiscal year-end to 3 months after fiscal year-end (Datastream);
- *BN* = 1 if *R* is negative, and 0 otherwise;
- *X* = earnings per share divided by share price at the beginning of the fiscal year (Datastream);

[15]These measures may not be good proxies if goodwill results from overpaid targets and delayed impairment.

- *Big4_Small* = 1 if one of the two external auditors is a Big 4 auditor and the other is not, and 0 if both external auditors are Big 4 auditors (Annual report);
- *Size* = natural logarithm of market value of equity (Datastream);
- *Leverage* = financial debt minus cash and cash equivalents, divided by market value of equity (Datastream);
- *Risk* = 5-year unlevered beta (Datastream);

Conditionally conservative accounting results in more aggressive reporting of bad news than good news, leading to a positive coefficient, b_3. We test H1b by testing whether the coefficient b_7 is positive. A positive estimate of b_7 indicates higher conservatism for firms audited by a Big 4–non-Big 4 auditor pair than for firms audited by a pair of two Big 4 auditors. We also control for size, leverage and risk.[16]

Auditor Pair Type and Recognition of Economic Impairment

We examine how auditor pairs affect the decision to recognize economic impairment of assets on the income statement. In essence, goodwill impairment is caused by deteriorating economic performance of the acquired businesses. Ideally, we should use the projected future cash flows expected to be generated by the unit containing the goodwill to assess whether the firm should book an impairment or not. However, because we do not have enough information to make an objective and accurate estimation, we can only look at current and past economic performance to assess the future prospects of the business. Since performance measures at the level of the cash generating unit to which goodwill is allocated are often unavailable, we can only use performance measures at the firm level to make our predictions. Prior research on goodwill impairment have used ROA, operating cash flows, and market-to-book ratio less than one as economic determinants of impairment (Beatty and Weber 2006; Hayn and Hughes 2006; AbuGhazaleh, Al-Hares, and Haddad 2012; Ramanna and Watts 2012).

In this study, we use the lowest quartile of ROA, the lowest quartile of operating cash flows scaled by lagged total assets, and market-to-book ratio less than one as low performance indicators. We expect that firms with low performance indicators are more likely

[16] We do not interact these control variables with BN, R, and BN*R as do Khan and Watts (2009). We estimate the Khan and Watts (2009) model and calculate C_Score using the coefficients from the model. C_Score is positively associated with Big4_Small (significant at less than 5% level, two-sided), which suggests that the Big 4–non-Big 4 auditor pair is more conditionally conservative. We do not use the Khan and Watts (2009) model to report our results because the signs of most of the interaction terms in the model used to calculate C_Score are not as unexpected. One possible reason for the unexpected coefficient signs is the unusual return-earnings relationship during the financial crisis period.

to have suffered an economic impairment. As a result, to test for the timeliness of impairment, we compare the likelihood of booking an impairment when performance is low for firms audited by different auditor pairs.

Use of these low performance indicators is justified. When market-to-book ratio is less than one, the firm's market value of equity is less than its book value, indicating that current book value is too high and it is likely that assets have been impaired. The use of ROA and operating cash flow is consistent with the estimation procedure for goodwill impairment specified in the international accounting standard. Impairment tests, in particular impairment tests for goodwill, usually involve discounted cash flow models, and require managers to make several assumptions. Appendix 1 gives a summary of how impairment tests are conducted under IAS 36. The procedure is similar to provisions in FAS 142 of US GAAP. Discounted cash flow models rely on projecting current performance over a business plan. If current operating performance is low, it is more likely that the present value of projected future cash flows will be below the carrying value of a given cash generating unit (see discussion of impairment testing in Appendix 1). Managers can manage the outcome of the test by choosing either overly optimistic growth assumptions or an artificially low discount rate (ESMA 2013). We reason that firms in the lowest quartile of ROA or operating cash flow for our sample are more likely to have economic impairment. We also estimate our model using the 5th, 10th, 15th and 20th percentile and the results are qualitatively similar. We estimate the following probit model:

$$\begin{aligned}\Pr(DIMP_t) = f(&c + b_1 Big4\_Small_t + b_2 LowPerf_t + b_3 LowPerf * Big4\_Small_t \\ &+ b_4 GW_t + b_5 MtoB_t + b_6 Perf_t + b_7 Return_t + b_8 \Delta Sales_t + b_9 Size_t \\ &+ b_{10} Leverage_t + b_{11} Risk_t + \varepsilon)\end{aligned} \tag{3}$$

where:

- *DIMP* = 1 the firm books an impairment, and 0 otherwise (Annual report);
- *Big4_Small* = 1 if one of the two external auditors is a Big 4 and the other is not, and 0 if both external auditors are Big 4 auditors (Annual report);
- *LowPerf* = 1 if: (1) EBITDA divided by lagged total assets is below the 25th percentile of the distribution, and 0 otherwise, or (2) cash from operations divided by lagged total assets is below the 25th percentile of the distribution, and 0 otherwise, or (3) market-to-book ratio is below one, and 0 otherwise;

- *Size* = natural logarithm of market value of equity (Datastream);
- *GW* = goodwill divided by total assets (Datastream);
- *MtoB* = market-to-book ratio of equity (Datastream);
- *Perf* = EBITDA divided by total assets (Datastream);
- *Return* = buy and hold return over the fiscal year (Datastream);
- *ΔSales* =percentage change in total sales (Datastream);
- *Leverage* = financial debt minus cash and cash equivalent, divided by market value of equity (Datastream);
- *Risk* = 5-year unlevered beta (Datastream).

To test H1c, we compare the probability of booking an impairment when performance is low between firms audited by a Big 4–non-Big 4 auditor pair and firms audited by a Big 4–Big 4 auditor pair, i.e., the sum of coefficients b_1 and b_3. If $b_1 + b_3$ is positive it indicates that firms with a Big 4–non-Big 4 auditor pair are more likely to book an impairment when the probability of economic impairment is high.

We control for factors affecting impairment, i.e., operating performance, stock price performance, business risk, size, market-to-book ratio, leverage and magnitude of goodwill in the balance sheet. The likelihood of economic impairment decreases with performance (*Perf*), market-to-book ratio (*MtoB*), sales growth (*ΔSales*), stock return (*Return*) and size (*Size*), and increases with goodwill (*GW*) and business risk (*Risk*). However, we do not make directional predictions on the coefficients of these control variables because prior research indicates that impairment tests may be manipulated.

Auditor Pair Type and Transparency of Impairment-Related Disclosures

For French listed firms, transparency of impairment test disclosures varies widely across firms. For example, the French pharmaceutical company, Stallergenes, in the "Main Accounting Methods" section of its 2006 annual report (p. 41), provides only minimal narrative information regarding impairment tests, such as "A write down is recorded once a year or more frequently if events or changes in circumstances indicate the likelihood of impairment for that acquisition goodwill", and "If an impairment is identified, the recoverable value of the CGU to which the acquisition goodwill belongs is assessed. An impairment is recognized as soon as the book value of the CGU to which the acquisition goodwill belongs exceeds the recoverable value." No further information regarding impairment tests is provided in the Notes, although the firm owns a substantial amount of intangible assets (goodwill alone

represents 24% of Stallergenes' total assets) for which impairment tests are required to be performed at least once a year.

In contrast, France Telecom's 2008 annual report contains much more transparent disclosures regarding impairment-testing procedures. In Note 6 (p. 287-289), the company devotes almost three pages to its impairment tests and provides a wide range of information. It explains the level at which goodwill is tested, and provides tables with key assumptions used in the estimation of recoverable amounts (e.g., growth rate to perpetuity for each segment, main cash generating units and groups of cash generating units, post- and pre-tax discount rates used for each segment), as well as narrative explanations for specific countries where it operates.[17]

Considering these differences in transparency and the incentives to manipulate impairment tests, we search each annual report for 40 items covering the main disclosures required by IAS 36 (paragraphs 126 to 133) and other disclosures providing the main valuation assumptions used in the estimation of recoverable values. These required disclosures are independent of the outcome of the impairment test, i.e., they should not depend on whether or not management decided to book an impairment. These 40 items are allocated to categories of information according to homogeneous topics. Appendix 2 lists the main categories, and the items in each category.

We assign one point per disclosed impairment item that is included in the annual report for year *t*, and compute a transparency score as follows:[18]

$$Score_t = \frac{1}{40}\sum_{j=1}^{40} Item_{i,t} * 100 \quad (4)$$

Score is the number of disclosed impairment items for a given firm-year divided by the maximum possible number of impairment disclosures, and is expressed as a percentage. As presented in Appendix 2, the list of impairment disclosures is quite comprehensive, covering technical valuation elements of impairment tests (e.g., discount rates, neutrality of the financing structure, terminal value issues) as well as descriptive elements (e.g., whether

[17] These two examples have been selected on purpose from a low disclosing firm (Stallegenes, 2006) and a high disclosing firm (France Telecom, 2008), based on our Transparency Score.

[18] The variable Score is not completely continuous but can take a large range of values since it equals the sum of 40 items. Because, it is not bounded between 0 or 100 (see Table 1, Panel E), we estimate model (5) with OLS. The results are qualitatively similar when we use a Tobit model.

management explains the alternative between fair value and value-in-use to estimate recoverable value, or whether valuation consultants were hired to perform impairment tests).

We estimate the following model to examine whether auditor pair composition is systematically related to the level of transparency of impairment disclosure:

$$Score_t = b_0 + b_1 Big4\_Small_t + b_2 LowPerf_t + b_3 LowPerf * Big4\_Small_t + b_4 GW_t + b_5 Float_t + b_6 Risk_t + b_7 Size_t + b_8 Perf_t + b_9 Leverage_t + b_{10} Coverage_t + b_{11} CrossList_t + b_{12} Change_t + \varepsilon \quad (5)$$

where:

- *Score* = measure of transparency of impairment disclosures, defined in (5) (Annual report);
- *Big4_Small* = 1 if one of the two external auditors is a Big 4 and the other is not, and 0 if both external auditors are Big 4 auditors (Annual report); *LowPerf* = 1 if: (1) EBITDA divided by lagged total assets is below the 25th percentile of the distribution, and 0 otherwise, or (2) cash from operations divided by lagged total assets is below the 25th percentile of the distribution, and 0 otherwise, or (3) market-to-book ratio is below one, and 0 otherwise;
- *GW* = goodwill divided by total assets (Datastream);
- *Float* = percentage of shares available to trade (Datastream);
- *Risk* = 5-year unlevered beta (Datastream);
- *Size* = natural logarithm of market value of equity (Datastream);
- *Perf* = EBITDA divided by total assets (Datastream);
- *Leverage* = financial debt minus cash and cash equivalents, divided by market value of equity (Datastream);
- *Coverage* = natural logarithm of the number of recommendations issued by financial analysts during the year (I/B/E/S);
- *CrossList* = 1 if the company is cross-listed in the US, and 0 otherwise;
- *Change* = 1 if the firm changes an external auditor during the fiscal year, and 0 otherwise (Annual report);

The coefficient of interest for testing H1d is b_3, which reflects the difference in the level of transparency manipulation between firms audited by a Big 4–non-Big 4 auditor pair and firms audited by a Big 4–Big 4 auditor pair. When operating performance is low, impairment

is more likely. As a result, given poor operating performance, impairment becomes a bigger concern for investors. If managers want to avoid booking an appropriate amount of impairment, they may manipulate the impairment test procedures. Thus, they will have incentives to provide less transparent impairment-related disclosures in order to reduce the possibility that outsiders detect the manipulation. Therefore, a decrease in transparency score when the operating performance is low could indicate that managers are manipulating the disclosure to support their inappropriate impairment accounting. Auditors can play a very important role in preventing such manipulation in transparency by making sure that outsiders have enough information to assess the appropriateness of management's estimation and assumption. If audit quality does not differ between Big 4–Big 4 auditor pairs and Big 4–non-Big 4 auditor pairs, the difference in disclosure quality between firms under low and high performance should be the same for the two auditor pair groups. Hence, the coefficient on *LowPerf*Big4_Small* would be zero. A positive coefficient on *LowPerf*Big4_Small* would suggest lower transparency manipulation and hence better audit quality for the Big 4–non-Big 4 auditor pair and vice versa.

We include several control variables in the model, including the percentage of total assets comprised of goodwill. We expect the level of goodwill to be positively associated with the transparency of impairment-testing disclosures. We also control for other factors affecting general disclosures, such as firm size, cross-listing status, business risk, free float, performance, leverage, and analyst coverage. Large, risky, high performing, cross-listed firms with large share floats and high financial leverage generally have incentives to disclose more. However, we do not know if, and how, these incentives affect specific impairment-testing disclosures. Therefore, we do not make directional predictions for the coefficients of these control variables. We predict that change in auditor could reduce impairment-testing disclosures. Analyst coverage captures an alternative channel of communication. Everything else equal, a firm followed by more analysts may disclose less information in its annual report as analysts can substitute for the information in the annual report (Botosan 1997, p. 326). However, prior studies also show that firms with higher disclosure quality tend to have higher analyst coverage (Healy, Hutton, and Palepu 1999). Therefore, we do not make a directional prediction for the effect of analyst coverage on impairment-related disclosures.

6. Empirical Results

Descriptive Statistics

Table 1, Panel A shows that our sample is relatively uniformly distributed across 10 industries, with chemicals (healthcare) having the highest (lowest) level of representation. Table 1, Panel B provides unconditional comparisons between firms audited by a Big 4–Big 4 pair and a Big 4–non-Big 4 pair. First, from a market share perspective, approximately 45% of the firms are audited by a Big 4–Big 4 auditor pair over the period, and the remaining 55% by a Big 4–non-Big 4 auditor pair. These statistics illustrate that the French audit market is one of the least concentrated in Europe as more than 50 percent of the large firms are audited by at least one non-Big 4 auditor whereas the Big 4 market share of listed firms in other G8 countries is typically above 90%.[19]

Table 1, Panel B provides the descriptive statistics for the main variables. First, it shows that the market-to-book ratio is significantly higher for firms audited by a Big 4–non-Big 4 pair (significant at less than 5%), consistent with firms audited by a Big 4–non-Big 4 pair reporting more conservatively than firms audited by a Big 4–Big 4 pair.

Second, while firms audited by a Big 4–Big 4 auditor pair booked impairments 52% of the time, firms audited by a Big 4–non-Big 4 pair impaired assets 35% of the time (difference significant at 1%). From a transparency perspective, the mean (median) impairment-test transparency score for the four-year period is 54 points (54 points). Firms audited by a Big 4–Big 4 pair exhibit a higher transparency score compared to firms audited by a Big 4–non-Big 4 pair. We note, however, that such a univariate comparison of the frequency of impairment or transparency score is not dependent on the existence of economic conditions indicating a high probability of impairment.

Third, Table 1, Panel B also shows that the mean (median) risk of firms in the sample, as proxied by 5-year unlevered beta, is 0.98 (0.74), the mean (median) return is 8.2% (-0.0%), the mean (median) percentage of firms' shareholder's equity that is available to trade (free float) is 67% (68%), the mean (median) impairment of assets represents on average 2.2% (0.0%) of total intangible assets over the time period,[20] the mean (median) operating performance measured by return on assets (EBITDA divided by total assets) is 12.4%

[19] http://www.gti.org/Press-room/Press-archive/2007/G8-audit-concentration.asp

[20] On the sub-sample of 136 firm-year observations booking impairment, the mean (median) impairment is 5.1% (1%) of total intangible assets, ranging from 0.1% of goodwill to 55% of goodwill.

(10.8%), and the mean (median) market-to-book ratio is 2.3 (2.0). We also observe that changes of either one or both auditors during a year do not occur frequently, i.e., only 3% of the time. Goodwill represents on average 28% (27%) of firms' total assets. Firms audited by two Big 4 auditors tend to be larger, have more institutional ownership, are more likely to be cross-listed, have more business risk, are more closely followed by analysts, are less leveraged, exhibit slightly less sales and assets growth, and spend less on capital expenditures.

In Table 1, Panel C we condition our analyses for the frequency and transparency of impairments on the existence of economic conditions suggesting the need for testing impairment. An impairment test is deemed necessary when there is evidence of an economic impairment, i.e., when market-to-book ratio is below one, when return on assets is low, or when cash from operations is low. For instance, when market-to-book ratio is below one, while firms audited by a Big 4–Big 4 auditor pair booked impairment only 43% of the time, firms audited by a Big 4–non-Big 4 auditor pair booked impairment 67% of the time. This simple observation indicates that *a priori* firms audited by a Big 4–non-Big 4 auditor pair exhibit higher levels of conditional conservatism, i.e., conditional on the existence of poor economic conditions, they are more likely to recognize bad news through impairments.

From Table 1, Panel C, we also observe that firms audited by a Big 4–non-Big 4 pair have a higher score for impairment-related disclosures once it is evident that an impairment is necessary for two of our three measures of low performance. In addition, the change in disclosure scores when economic performance deteriorates, i.e., when market-to-book ratio is below one, when the firm is in the lowest quartile of ROA or the lowest quartile of OCF presented in Table 1, Panel D shows that, for firms audited by a Big 4–non-Big 4 auditor pair, the disclosure scores increase when the firms report poor performance. By contrast, for firms audited by a Big 4–Big 4 auditor pair, the disclosure scores decrease under poor performance.

Combining the results from Panels B, C, and D of Table 1, we conclude that although on average firms audited by a Big 4–Big 4 auditor pair book impairments more frequently and score higher on impairment-related disclosures, they tend to recognize impairments less frequently and provide less transparent impairment-related disclosures when economic conditions suggest that an impairment is likely to have occurred.

In Panel E of Table 1, we perform an analysis of differences in transparency over time. The results indicate an increase over time in the level of transparency score of impairment disclosures with the mean (median) score rising from 50 (51) in 2006 to 59 pts (58 pts) in

2009. The dispersion of transparency score also tends to increase over the period (from 14 pts in 2006 to 16 pts in 2009).

We conclude our descriptive analyses with the correlation matrix in Table 1, Panel F. *DIMP* is significantly positively correlated with *Score*, *Size*, *CrossList* and *Coverage*, and negatively correlated with *OCF*, *Score*, *ΔAssets*, *Capex* and *MtoB*. The results also indicate that *Score* is positively correlated with *CrossList*, *Size*, *Float*, *GW*, *Leverage* and *Coverage.* The level of transparency is negatively correlated with *Perf*, *OCF*, *MtoB*, *ΔAssets*¸ *Change* and *Capex*. *Big4_Small* is negatively correlated with both *DIMP* and *Score,* confirming that firms audited by Big 4–Big 4 pairs are on average unconditionally more transparent in their impairment test disclosures.

[Insert Table 1 About Here]

Auditor Pair Type and Conservatism

H1 examines the association between auditor pair type and audit quality. While a Big 4–Big 4 auditor pair is likely to exhibit a higher level of competence, a Big 4–non-Big 4 pair may offset the potentially lower level of competence with a higher level of independence. The overall impact of auditor pair composition on audit quality depends on the relative differences in terms of competence and independence. We use the degree of conservatism in financial reporting by the client of the auditor pair as the proxy for audit quality, and examine both unconditional and conditional conservatism. We use model (1) to test H1a, which asserts that the degree of unconditional conservatism is not a function of auditor pair type, and report the estimation results in Table 2. The coefficient on Big 4–non-Big 4 auditor pair is positive and significant at the 5% level indicating a higher audit quality measured by unconditional conservatism for these auditor pairs compared to Big 4–Big 4 pairs.

[Insert Table 2 About Here]

H1b evaluates audit quality differences measured in terms of conditional conservatism across the two types of auditor pairs. We test H1b using model (2) which is based on Basu (1997), and report the estimation results in Table 3.

[Insert Table 3 About Here]

The differential effect on the degree of conditional conservatism, (i.e., the asymmetrically timely recognition of bad news versus good news) of Big 4–non-Big 4 auditor

pair type over Big 4–Big 4 auditor pair type is captured by b_7, which is significantly positive (at 10%; two-tailed test). It indicates that firms audited by a Big 4–non-Big 4 auditor pair report economic losses "more aggressively" than economic gains. Marmousez (2009) reports qualitatively similar but statistically stronger results for an earlier time period (2003). Our comparatively lower statistical significance may be due to the time period of the study, i.e., 2006-2009. One reason for the lower association between earnings and returns is that our sample period includes the financial crisis of 2008, when firms' returns were affected more by macroeconomic factors than by microeconomic, firm-specific factors.[21]

Using general measures of conservatism, tests for H1a and H1b indicate better audit quality for the Big 4–non-Big 4 auditor pair compared with the Big 4–Big 4 auditor pair.[22] In order to provide more refined tests of the effect of auditor pair type on audit quality, we next analyze a specific account, impairment.

Auditor Pair Type and Recognition of Economic Impairments

The purpose of these tests is to examine whether the differential audit quality across auditor pair types documented using measures of unconditional and conditional conservatism are also found at the level of more precise accounting procedures such as impairment testing. In this regard, H1c examines differences across auditor pair types in timeliness of loss recognition through impairments. To test H1c, we estimate model (3) which assesses the probability of a firm reporting an impairment when economic conditions indicate that the probability of impairment is high. We measure the degree of deterioration in the firm's economic condition using our low performance indicators, i.e. lowest quartile of ROA, lowest quartile of OCF, market-to-book less than one. The coefficient of interest in model (3) is b_1+b_3, which reflects the incremental likelihood of impairment for firms with lower economic performance that are audited by a Big 4–non-Big 4 auditor pair over firms audited by a Big 4–Big 4 auditor pair. We report the estimation results of the probit model (3) in Table 4.

[Insert Table 4 About Here]

[21] Marmousez (2009) also includes smaller firms in her sample, which may be an additional explanation for her results exhibiting greater statistical significance.

[22] The results from model (1) and model (2) suggest that firms audited by a Big 4–non-Big4 auditor pair exhibit higher unconditional and conditional conservatism. This is not inconsistent with Pope and Walker (2003) and Beaver and Ryan (2005) who show that for a given firm higher unconditional conservatism *ex ante* reduces conditional conservatism *ex post*. Indeed, we compare levels of conservatism across firms and not relations between unconditional and conditional conservatism within a given firm.

The coefficient of interest, b_1+b_3, is positive and significant for each of the three low performance indicators (significant at 5% for ROA and OCF, 1% for market-to-book). These results indicate that when performance is poor, firms audited by a Big 4–non-Big 4 auditor pair are more likely to book impairments than firms audited by a Big 4–Big 4 auditor pair.

Taken together, our tests of H1a, H1b and H1c indicate that, on average, firms audited by Big 4–non-Big 4 auditor pairs exhibit higher levels of audit quality than firms audited by Big 4–Big 4 auditor pairs. The discussion in Section 4 attributes the difference in audit quality to differences in competence and/or independence across auditor pairs. Given that Big 4–Big 4 auditor pairs are likely to have higher auditor competence than Big 4–non-Big 4 auditor pairs, the finding of lower audit quality for firms audited by Big 4–Big 4 auditor pairs suggests that they must possess lower auditor independence. Given this, our results for H1a, H1b and H1c indicate that auditor independence is lower for Big 4–Big 4 auditor pairs and that auditor independence dominates auditor competence in the effect of auditor pair type on audit quality in this joint audit setting.

Auditor Pair Type and Transparency of Impairment-Related Disclosures

Having documented differences in audit quality across auditor pairs using both aggregate and specific measures of conservatism, we next attempt to identify the source of such differences. If we view audit quality as a function of auditor competence and auditor independence, the higher audit quality for the pair of Big 4 and non-Big 4 auditors must come from higher auditor independence, as auditor competence for the Big 4–Big 4 pair is unlikely to be lower than that for the Big 4–non-Big 4 pair. Auditor independence and auditor competence are difficult to directly measure because it is hard to differentiate whether the auditor fails to report a breach because they cannot discover it or because they discover it but choose not to report it. Thus, it is difficult to test the auditor independence explanation directly. We attempt to strengthen our argument for auditor independence by testing audit quality in a setting where auditor independence is likely to play a more important role than auditor competence. We test H1d by comparing the transparency of impairment-related disclosures across auditor pairs. We reason that because knowing the required impairment-related disclosures listed in the accounting standards forms the basic or minimal level of auditor competence, whether the auditor will allow or disallow the management to provide less transparent disclosures when the operating performance is poor is mainly affected by auditor independence. As a result, if

we find any difference in audit quality using the transparency proxy, the difference should be largely driven by differences in auditor independence.

[Insert Table 5 About Here]

We find that firms audited by Big 4–Big 4 auditor pairs reduce their disclosure transparency when they have poor performance (the coefficient on *LowPerf* is negative for all three indicators, insignificant for ROA and market-to-book, significant at 5% for OCF). In contrast, firms audited by Big 4–non-Big 4 pairs increase their disclosure transparency when operating performance is low (the sum of the coefficients on *LowPerf* and *LowPerf*Big 4_Small* is positive for all three indicators). This indicates that firms audited by Big 4–Big 4 pairs make less transparent impairment disclosures when firms have poor performance while firms audited by Big 4–non-Big 4 pairs do not. The difference in the change of disclosure transparency between the two groups is captured by the coefficient on *LowPerf*Big4_Small*, which is positive and significant at 10% for ROA, 5% for OCF, and insignificant for MTB. This indicates that the Big 4–non-Big 4 auditor pair requires more transparent disclosures by firms, suggesting that it is more independent compared to the Big 4–Big 4 auditor pair. These results suggest higher audit quality, and most likely higher auditor independence, for the Big 4–non-Big 4 auditor pair. This is consistent with our expectation developed in section 6 that Big 4 auditors, which bear disproportionately high reputation and litigation costs when paired with non-Big 4 auditors, face stronger incentives to force firms to report more transparent disclosures when the performance is poor.[23]

The results in Table 5 also show that the transparency of impairment-related disclosures increases with goodwill in the balance sheet, risk, analyst coverage and auditor change, and decreases with performance. Overall, the model explains 33% of the variation of the transparency score.

7. Effect of Self-Selection

We examine the effect of self-selection on our results in this section. Given that firms voluntarily choose the type of auditor pair, the observed differences in conservatism may be attributable to differences in underlying characteristics of the firms that make the auditor pair choice. We use the two-stage procedure proposed by Heckman (1979) and the 'treatment

[23]Additional analysis also shows that when impairment is booked, firms audited by Big 4–non-Big 4 pairs are associated with larger increase in transparency compared with firms that are audited by Big 4–Big 4 pairs. Results are available from the authors upon request.

effect model' (Lennox, Francis, and Wang 2012) to control for this potential endogeneity. We first use several instruments (exclusion restrictions) to explain auditor pair choice and then include the inverse Mills ratio computed from the auditor pair choice model in the second stage models.

Prior research on single audit indicates that Big 4 accounting firms are more likely to be used by large and growing companies, complex companies, and companies with more international operations, all of which may require the international dimension, scale and expertise of a Big 4 auditor (Francis and Wilson 1988; DeFond 1992; Anderson, Stokes, and Zimmer 1993; Chaney, Jeter, and Shivakumar 2004; Khurana and Raman 2004). Additionally, Big 4 firms are more likely to be hired by profitable companies able to pay higher audit fees, and by more leveraged companies whose creditors demand more external scrutiny (Francis et al. 2009).

However, these factors do not necessarily directly apply to joint audit. For example, a growing company does not necessarily need to be audited by two Big 4 firms. One Big 4 auditor may be sufficient and it may be more efficient for a growing firm to choose one Big 4 and one non-Big 4 auditor. Therefore, expected relationships from the single audit literature may not hold for joint audit. In the context of joint audit, Francis et al. (2009) identify a positive relation between the choice of two Big 4 auditors and ownership structure factors, such as percentage of institutional investors, cross-listing status and percentage of free float.

Based on prior literature, we estimate the following model which serves as a first stage, treatment effect model, and compute the IMR which we use in subsequent models to correct for the potential endogeneity bias of auditor pair choice:

$$\begin{aligned}\Pr(Big4\_Small_t) &= f(c + b_1 Inst_t + b_2 Complex_t + b_3 \Delta Assets_t + b_4 CrossList_t \\ &+ b_5 Foreign\%_{i,t} + b_6 Float_t + b_7 Leverage_t + b_8 Risk_t + b_9 Size_t \\ &+ b_{10} Perf_t + \varepsilon)\end{aligned} \quad (6)$$

where:

- *Inst* = percentage of shares owned by institutional investors (Bloomberg).
- *Complex* = sales divided by lagged total assets (Datastream);
- Δ*Assets* = percentage change in total assets (Datastream);
- *CrossList* = 1 if the company is cross-listed in the US, and 0 otherwise (Annual Report);
- *Foreign*% = percentage of foreign sales (Datastream);

- *Float* = percentage of shares available to trade (Datastream);
- *Leverage* = financial debt minus cash and cash equivalents, divided by market value of equity (Datastream);
- *Risk* = 5-year unlevered beta (Datastream);
- *Size* = natural logarithm of market value of equity (Datastream);
- *Perf* = EBITDA divided by total assets (Datastream).

Table 6 presents the estimation results of the probit model (6) that identifies factors related to the choice of auditor pair type.

[Insert Table 6 About Here]

The results indicate that larger firms, firms with more complex operations, firms with higher institutional holdings, firms with more business risk, better performing firms, firms with higher levels of financial leverage, and firms cross-listed in the US tend to choose a Big 4–Big 4 auditor pair over a Big 4–non-Big 4 auditor pair. Prior research indicates that these factors are associated with more conservative financial reporting (e.g., Ahmed, Billings, Morton, and Stanford-Harris 2002; Ramalingegowda and Yu 2012). Therefore, everything else equal, any selection bias introduced by a firm's joint auditor pair choice positively influences the probability of finding higher conservatism for firms audited by two Big 4 auditors, i.e., the selection should bias against our prediction. Overall, the pseudo-R^2 is 41% and is relatively high compared to previous studies (see Francis et al. 2009Table 3). We run the tests for unconditional conservatism, conditional conservatism, and transparency of impairment with the IMR obtained from the first stage auditor pair choice model as an additional control variable. We note that the restrictions used in our treatment effect models are to some extent *ad hoc*, i.e., we do not rely on established theory to explain why we exclude some independent variables in the second stage model. However, following Lennox et al. (2012, p. 610) we corroborate the primary inferences from OLS models when "defensible exclusion restrictions are not available." Additionally, the results from model (6) show that self-selection works against our findings.

Untabulated results[24] from our treatment effect models, i.e., models including the IMR variable derived from model (6), give qualitatively similar results for unconditional conservatism (market-to-book), conditional conservatism, and transparency of impairment tests (Score). In these three models the significance of the coefficients of our main variables

[24] Available upon request.

of interest (i.e., *Big4_Small*, *Big4_Small*BN*R*, and *Big4_Small*LowPerf*) are higher, consistent with self-selection working against our findings.

8. Conclusion

In the current international debate on legal audit reform, France's unique institutional environment offers an ideal setting for assessing the benefits and potential limits of joint audit. We show that the two dimensions of audit quality, namely competence and independence, are likely to differ across different auditor pairs. We provide theoretical and empirical evidence on the implication of joint auditor pairs for accounting conservatism using established measures of conservatism as well as impairment test timeliness and transparency.[25]

We argue that the pairing of two Big 4 auditors, who share the litigation and reputation cost equally, may rely on each other too much when deciding on whether to report a discovered breach or not. This situation is less likely to occur when a Big 4 auditor is paired with a non-Big 4 auditor because the Big 4 auditor bears a disproportionately larger percentage of the reputation and litigation costs. The unequal risk sharing can motivate the Big 4 auditor to remain independent and enforce conservative financial reporting. We examine the relation between auditor pair type and measures of unconditional and conditional conservatism using market-to-book ratio and Basu's (1997) asymmetric timeliness coefficient, respectively, and complement these analyses with tests of impairment timeliness and transparency which facilitate a finer examination of the relations between auditor pair type and conservatism.

Using a sample of French listed firms, we present evidence that firms audited by Big 4–non-Big 4 auditor pairs are more unconditionally and conditionally conservative and more likely to recognize economic impairment than firms audited by Big 4–Big 4 auditor pairs. We further show that unlike firms audited by Big 4–Big 4 pairs, firms audited by Big 4–non-Big 4 pairs become more transparent in their impairment disclosure when their operating performance is poor. Overall, these results are consistent with our theoretical predictions.

We contribute to the literature at several levels. First, we provide insights on the implication of joint audit for audit quality that are relevant to policy makers. Our study

[25] We have also examined the relation between auditor pairs and abnormal accruals and find no statistical differences between firms audited by Big 4–Big 4 pairs vs. Big 4–non-Big 4 pairs and absolute or signed abnormal accruals.

indicates that policy makers considering joint audit in order to decrease the market concentration and improve audit quality should consider the composition of auditor pairs. A pair of two Big 4 auditors will not necessarily result in better audit quality than a pair of one Big 4 auditor and one non-Big 4 auditor. In fact, our results indicate that the Big 4–non-Big 4 auditor pair could result in higher audit quality due to higher auditor independence. Second, using self-constructed measures of impairment disclosure transparency, we attempt to disentangle the effects of competence and independence on audit quality. Lastly, we show that strategic interactions between the joint auditors are important in determining their action and hence the audit quality. Specifically, unequal risk sharing between Big and Small auditors can affect auditors' independence and is likely to have an effect on audit quality.

The results presented in this study can be generalized to other countries, in particular in Europe. Among countries using joint audit, France has the largest stock market (third in Europe behind the UK and Germany) and shares many common institutional features with other continental European countries such as the origin of the legal system, governance mechanisms, and capital structure. The time period of our study covers years 2006 to 2009, which include the financial and economic crisis of 2008 – 2009 that affected all the European countries as well as many countries outside Europe. This period offers ideal conditions to assess the implications of auditor pairs on enforcement of impairment tests that ensure conservatism of financial reporting.

Appendix 1 – Impairment Tests: Background

IAS 36, "Impairment of assets" (IASB 2004), prescribes the procedures and disclosures required to perform impairment tests. IAS 36 covers a large range of assets from tangible to intangible assets: land, buildings, machinery, investment property, investments in subsidiaries carried at cost, technologies, brands, customer relationships, and goodwill. Impairments are required to be reported in profit or loss if the net book value of an asset is higher than the recoverable value, the latter being the higher of fair value less costs to sell or value-in-use. If it is impossible to determine the recoverable amount for an individual asset, IAS 36 prescribes that recoverable amount be determined for groups of assets known as cash generating units. In order to identify a specific cash generating unit, the associated cash flows must be independent from cash flows arising from other cash generating units. Goodwill is typically allocated to one or several cash generating units and tested indirectly within a cash generating unit or group of cash generating units. The fair value estimate of the cash generating unit is typically based either on a discounted cash flow approach or on a relative valuation approach except when a cash generating unit is listed (which is extremely rare). If the recoverable value of a cash generating unit to which goodwill has been allocated is below its carrying value, the entity must recognize an impairment loss. The value of goodwill is written down first before reducing other assets' carrying values.

Because of the valuation methods used, impairments of assets are based on management estimates (Petersen and Plenborg 2010, p. 420). Managers usually acknowledge that they use specific assumptions for impairment testing purposes. For example in Alcatel-Lucent's 2008 annual report (p. 245) its management acknowledges that "the recoverable values of our goodwill and intangible assets, as determined for the impairment tests performed by the Group, are based on key assumptions which could have a significant impact on the consolidated financial statements. These key assumptions include, among other things, the following elements: discount rate; and projected cash-flows […]." Managers are often not explicit regarding the valuation assumptions they used to estimate recoverable values.

Appendix 2 - List of the Items of the Score Measuring the Transparency of Impairment Tests

# items	Categories	Items
1	Presentation and general explanations of IAS 36	Does the report explicitly mention IAS 36?
2		Does the report explain the alternative between value-in-use and fair value less costs to sell to estimate recoverable value?
3	Details on valuation methods: fair value or value-in-use	Does the report mention "costs to sell" to estimate fair value?
4		Does the report mention the use of a DCF model to determine value-in-use?
5		Does the report mention the use of a DCF model to determine fair value (as a level 3 estimate)?
6		Does the report mention another approach to determine fair value?
7	Complexity of methods used	Does the report mention using different methods for valuation of different CGUs?
8		Does the report mention different valuation methods for the same CGU?
9	Number of cash-generating units	Does the report include the number of CGUs
10	Details on the cost of capital	Does the report mention the alternative between WACC and other approach?
11		Does the report mention the use of another model to estimate cost of capital?
12		Does the report mention the tax effect on discount rate?
13		Does the report give details on the computation of the discount rate (e.g., risk premium, risk free rate)?
14	Number of discount rates	Does the firm adjust the firm's wide discount rate for specific CGUs?
15		Does the report explain the use of different discount rates per CGU?
16		Does the report explain the adjustments/different discount rates used?
17	Financing neutrality and discount rate	Does the report mention the neutrality of the financing structure on the discount rate?
18	Origin of the discount rate	Does the report mention using outside consultants to conduct impairment tests/provide services in the valuation process?
19		Does the report mention using consultants to estimate discount rates?
20		Does the report mention that discount rates are based on estimates of analysts following the firm?
21		Does the report mention that discount rates are based on estimates of analysts following the sector?
22	Discount rate components	Does the report disclose the base rate of the discount rate?
23		Does the report disclose the risk free rate chosen?
24		Does the report mention the beta coefficient chosen?
25		Does the report mention the risk premium chosen?

26		Does the report mention management's target leverage ratio?
27		Does the report mention the specific beta of the company?
28		Does the report mention the beta of peer firms?
29	Impairment test sensitivity	Does the report mention sensitivity tests performed on the discount rate?
30		Does the report mention sensitivity tests performed on projected cash flows or other parameters?
31	Explanation of the variations of the discount rate	Does the report explain the variations of discount rates from year to year?
32	Cash flows	Does the report explain if projected cash flows are CGU-specific, from management BP or from analysts' forecasts?
33	Discount rate & cash flows adequacy	Does the report mention that cash flows and discount rates are adequate (e.g., both pre-tax and do not take into account same risks twice)?
34	Extrapolation	Does the report mention the extrapolation period between the end of the BP and terminal value?
35		Does the report mention what is the maximum number of periods for BPs?
36		Does the report mention what is the extrapolation period after the BP (if applicable)?
37	Terminal value	Does the report mention if terminal value is computed with a multiple?
38		Does the report mention if terminal value is computed with an infinite projection period?
39		Does the report mention the level of multiple applied (if applicable)?
40		Does the report mention the terminal growth assumption (if applicable)?

Notes. DCF: Discounted Cash Flows, CGU: Cash Generating Unit, WACC: Weighted Average Cost of Capital, BP: Business Plan.

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Table 1 –Summary Statistics of the Main Variables

Panel A – Overview of the Sectors Composing the Sample

	%	N
Restaurants and Hotels	8.8%	8
Services and Transport	8.8%	8
Chemicals	13.2%	12
Technologies	11.0%	10
Car Manufacturers	11.0%	10
Software and Professional Services	9.9%	9
Energy	8.8%	8
Food Products	11.0%	10
Healthcare	5.5%	5
Telecom and Media	12.1%	11
Total Firms	100%	91

Firms are grouped according to Bloomberg sectors.

Panel B –Summary Statistics of the Main Variables

	Total Sample N = 316			Big4_Big4 = 1 n = 143			Big4_Small = 1 n = 173			BB - BS	
	Mean	Median	St. Dev	Mean	Median	St.Dev	Mean	Median	St. Dev	Mean Diff	
DIMP	0.427	0.000	0.495	0.517	1.000	0.501	0.353	0.000	0.479	0.074	***
Score	53.811	54.200	16.214	56.541	56.700	16.559	51.554	53.300	15.614	2.257	***
Perf	0.124	0.108	0.081	0.130	0.114	0.093	0.119	0.106	0.068	0.005	
OCF	0.102	0.090	0.070	0.104	0.094	0.062	0.101	0.084	0.077	0.001	
MtoB	2.353	2.010	1.566	2.162	1.960	1.427	2.510	2.050	1.659	-0.157	**
Imp%	0.022	0.000	0.080	0.025	0.001	0.084	0.019	0.000	0.077	0.003	
Inst	0.319	0.266	0.209	0.354	0.378	0.217	0.291	0.262	0.199	0.028	***
Complex	0.822	0.795	0.379	0.845	0.776	0.374	0.804	0.811	0.382	0.018	
ΔAssets	0.100	0.038	0.280	0.067	0.027	0.230	0.127	0.044	0.313	-0.027	*
Foreign%	0.559	0.583	0.243	0.580	0.632	0.248	0.542	0.551	0.238	0.017	
CrossList	0.187	0.000	0.390	0.287	0.000	0.454	0.104	0.000	0.306	0.083	***
ΔSales	0.035	0.029	0.134	0.023	0.025	0.125	0.045	0.035	0.140	-0.01	
Float	0.674	0.682	0.243	0.676	0.730	0.263	0.673	0.664	0.226	0.001	
GW	0.284	0.267	0.180	0.282	0.255	0.184	0.287	0.288	0.177	-0.003	
PPE	0.470	0.367	0.340	0.494	0.420	0.352	0.451	0.351	0.330	0.019	
Risk	0.984	0.733	0.915	1.262	0.783	1.226	0.753	0.683	0.416	0.231	***
Size	8.476	8.477	1.377	9.151	9.124	1.242	7.918	7.870	1.227	0.558	***
Leverage	0.355	0.239	0.782	0.258	0.166	0.831	0.435	0.283	0.731	-0.08	
Change	0.032	0.000	0.175	0.028	0.000	0.165	0.035	0.000	0.184	-0.003	
Coverage	5.319	5.371	0.417	5.447	5.493	0.406	5.213	5.263	0.396	0.106	***
Capex	0.063	0.043	0.069	0.045	0.042	0.028	0.077	0.044	0.088	-0.014	***
R	0.082	-0.007	0.497	0.114	-0.013	0.564	0.056	0.015	0.435	0.026	
X	0.076	0.054	0.123	0.069	0.054	0.069	0.061	0.054	0.057	0.015	

*p<.1 (two-sided tests); **p<.05(two-sided tests); ***p<.01 (two-sided tests)

Big4_Big4 = 1 if the firm's external auditors are both Big 4 auditors (Annual report). *Big4_Small* = 1 if one of the two external auditors is a Big 4 auditor and the other is not, and 0 if both external auditors are Big 4 auditors (Annual report). *DIMP* = 1 if the firm books an impairment, and 0 otherwise (Annual report). *Score* = self-constructed measure of transparency of impairment tests (Annual report). *Perf* = EBITDA divided by lagged total assets (Datastream). OCF = operating cash flows divided by lagged total assets (Datastream). *MtoB* = market-to-book ratio of equity (Datastream). *Imp%*= impairment charge, if any, divided by lagged total intangible assets (Annual report and Datastream). *Inst* = percentage of shares owned by institutional investors (Bloomberg). *Complex* = sales divided by lagged total assets (Datastream). *ΔAssets* = percentage change in total assets (Datastream). *CrossList* = 1 if the company is listed in the US, and 0 otherwise. *Foreign%* = percentage of foreign sales (Datastream). *ΔSales* = change in total sales divided by lagged total assets (Datastream). *Float* = percentage of shares available to trade (Datastream). *GW* = goodwill divided by lagged total assets (Datastream). *PPE* = property, plant and equipment divided by lagged total assets (Datastream). *Risk*= 5-year unlevered beta (Datastream). *Size* = natural logarithm of market value of equity (Datastream). *Leverage* = financial debt minus cash and cash equivalent, divided by market value of equity (Datastream). *Change* = 1 if the firm changes external auditor during the fiscal year, and 0 otherwise (Annual report). *Coverage* = natural logarithm of the number of recommendations issued by financial analysts during the year (I/B/E/S). *Capex* = capital expenditures divided by lagged total assets (Datastream). *R* = share return measured from 9 months prior to fiscal year-end to 3 months after fiscal year-end. *X* = earnings per share divided by share price at the beginning of the fiscal year.

Panel C – Frequency of Impairment (*DIMP*) and Transparency (*Score*) by Auditor Pair Type conditional on performance

	MtoB < 1			Lower than 25th ROA			Lower than 25th OCF		
		DIMP	*Score*		*DIMP*	*Score*		*DIMP*	*Score*
	N	Mean	Mean	N	Mean	Mean	N	Mean	Mean
Big4_Big4	21	0.429	58.57	34	0.382	56.11	29	0.414	54.98
Big4_Small	18	0.667	64.63	45	0.489	53.87	50	0.520	55.27
All	39	0.538	61.22	79	0.443	54.84	79	0.481	55.16

Panel D – Change in Transparency of Impairment Tests (*Score*) by Auditors Pair Type Conditional on Performance (market-to-book, ROA and OCF)

	Score				
	MtoB > 1		*MtoB* <1		Change
	N	Mean	N	Mean	
Big4_Big4	121	55.97	21	58.57	2.60
Big4_Small	155	50.07	18	64.63	14.55
All	276	52.66	39	61.22	
	Score				
	ROA > 25th		*ROA* < 25th		Change
	N	Mean	N	Mean	
Big4_Big4	109	56.68	34	56.11	-0.56
Big4_Small	128	50.73	45	53.87	3.13
All	237	53.46	79	54.83	
	Score				
	OCF > 25th		*OCF* < 25th		Change
	N	Mean	N	Mean	
Big4_Big4	114	56.94	29	54.98	-1.96
Big4_Small	123	50.04	50	55.27	5.22
All	237	53.36	79	55.16	

Panel E – Transparency of Impairment Tests (*Score*) by Year

	N	Mean	St. Dev	Min	1st Q.	Median	3rd Q.	Max
year = 2006	69	50.170	14.191	13.300	40.800	50.800	60.800	84.200
year = 2007	81	50.680	15.780	13.300	44.200	51.700	60.800	89.200
year = 2008	82	54.839	16.688	13.300	45.000	56.250	64.200	89.200
year = 2009	84	58.818	16.553	13.300	49.550	58.300	68.300	89.200
All	316	53.811	16.214	13.300	45.000	54.200	64.200	89.200

Panel F – Correlation Matrix between Variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	*Big4_Small*	1.00																							
2	*DIMP*	-0.17***	1.00																						
3	*Score*	-0.15***	0.11**	1.00																					
4	*Perf*	-0.07	-0.07	-0.17***	1.00																				
5	*OCF*	-0.02	-0.13**	-0.22***	0.76***	1.00																			
6	*MtoB*	0.11**	-0.12**	-0.27***	0.20***	0.25***	1.00																		
7	*Imp*	-0.03	0.32***	-0.01	-0.01	-0.10*	-0.23***	1.00																	
8	*Inst*	-0.15***	0.04	0.08	-0.07	-0.02	0.03	-0.04	1.00																
9	*Complex*	-0.05	0.03	-0.01	0.29***	0.34***	0.08	-0.08	0.00	1.00															
10	*DAssets*	0.11*	-0.09	-0.14**	-0.04	0.22***	0.07	-0.05	0.05	0.20***	1.00														
11	*Foreign%*	-0.08	0.02	-0.05	-0.11*	-0.07	-0.01	-0.02	0.13**	-0.10*	-0.09	1.00													
12	*CrossList*	-0.23***	0.11**	0.14**	0.00	0.00	-0.08	0.06	0.09	-0.11*	-0.04	0.20***	1.00												
13	*ΔSales*	0.08	-0.03	-0.21***	0.21***	0.35***	0.29***	-0.11*	-0.01	0.38***	0.48***	-0.11*	-0.03	1.00											
14	*Float*	-0.01	0.09*	0.16***	-0.05	-0.08	-0.13**	0.12**	0.30***	0.12**	-0.07	0.27***	0.29***	-0.07	1.00										
15	*GW*	0.01	0.06	0.21***	-0.11**	-0.08	-0.08	-0.09	0.07	-0.04	0.03	0.11**	0.26***	0.04	0.19***	1.00									
16	*PPE*	-0.06	-0.09	-0.11*	0.07	0.15***	0.06	-0.11**	-0.06	0.07	0.13**	0.02	-0.11**	0.06	-0.08	-0.51***	1.00								
17	*Risk*	-0.28***	-0.09	0.03	0.19***	0.17***	-0.13**	0.07	-0.04	0.13**	-0.07	0.12**	0.07	0.00	0.02	-0.22***	-0.16***	1.00							
18	*Size*	-0.42***	0.26***	0.27***	-0.30***	-0.28***	-0.20***	-0.01	0.14**	-0.20***	0.01	0.12**	0.30***	-0.06	0.13**	0.06	0.08	0.00	1.00						
19	*Leverage*	0.11**	-0.01	0.11*	-0.21***	-0.23***	0.05	0.05	-0.03	-0.20***	0.16***	-0.17***	-0.01	0.03	0.02	0.21***	0.07	-0.56***	0.12**	1.00					
20	*Change*	0.02	-0.01	-0.12**	-0.02	0.06	-0.07	0.10*	0.05	-0.01	0.15***	-0.11*	-0.09	0.09	-0.06	-0.11**	0.03	-0.04	0.01	-0.05	1.00				
21	*Coverage*	-0.28***	0.17***	0.18***	-0.08	-0.13**	-0.04	-0.04	0.15***	-0.13**	-0.10*	0.07	0.36***	-0.09	0.28***	0.17***	-0.15***	0.09*	0.62***	-0.15***	-0.16***	1.00			
22	*Capex*	0.23***	-0.12**	-0.39***	0.08	0.22***	0.11**	-0.04	-0.10*	-0.07	0.28***	-0.05	-0.15***	0.11*	-0.16***	-0.20***	0.36***	-0.12**	-0.23***	0.07	0.12**	0.28***	1.00		
23	*R*	-0.06	0.01	0.07	-0.06	0.07	-0.24***	-0.02	0.01	-0.06	-0.10*	0.05	-0.03	-0.26***	-0.06	-0.01	0.05	0.04	-0.02	-0.05	-0.03	-0.02	-0.08	1.00	
24	X	-0.07	-0.02	-0.18***	0.20***	0.24***	0.16***	-0.14**	0.00	0.05	0.21***	0.10*	-0.07	0.35***	-0.02	0.00	0.10*	-0.03	0.15***	0.03	0.00	-0.08	0.06	-0.03	1.00

*p<.1 (two-sided tests); **p<.05(two-sided tests); ***p<.01 (two-sided tests)

Big4_Big4 = 1 if the firm's external auditors are both Big 4 auditors (Annual report). *Big4_Small* = 1 if one of the two external auditors is a Big 4 auditor and the other is not, and 0 if both external auditors are Big 4 auditors (Annual report). *DIMP* = 1 if the firm books an impairment, and 0 otherwise (Annual report). *Score* = self-constructed measure of transparency of impairment tests (Annual report). *Perf* = EBITDA divided by lagged total assets (Datastream). OCF = operating cash flows divided by lagged total assets (Datastream). *MtoB* = market-to-book ratio of equity (Datastream). *Imp%*= impairment charge, if any, divided by lagged total intangible assets (Annual report and Datastream). *Inst* = percentage of shares owned by institutional investors (Bloomberg). *Complex* = sales divided by lagged total assets (Datastream). *ΔAssets* = percentage change in total assets (Datastream). *CrossList* = 1 if the company is listed in the US, and 0 otherwise. *Foreign%* = percentage of foreign sales (Datastream). *ΔSales* = change in total sales divided by lagged total assets (Datastream). *Float* = percentage of shares available to trade (Datastream). *GW* = goodwill divided by lagged total assets (Datastream). *PPE* = property, plant and equipment divided by lagged total assets (Datastream). *Risk*= 5-year unlevered beta (Datastream). *Size* = natural logarithm of market value of equity (Datastream). *Leverage* = financial debt minus cash and cash equivalent, divided by market value of equity (Datastream). *Change* = 1 if the firm changes external auditor during the fiscal year, and 0 otherwise (Annual report). *Coverage* = natural logarithm of the number of recommendations issued by financial analysts during the year (I/B/E/S). *Capex* = capital expenditures divided by lagged total assets (Datastream). *R* = share return measured from 9 months prior to fiscal year-end to 3 months after fiscal year-end. *X* = earnings per share divided by share price at the beginning of the fiscal year.

Table 2 –Auditor Pair Type and Unconditional Conservatism (Market-to-Book)

$$MtoB_t = b_0 + b_1 Big4\_Small_t + b_2 Return_t + b_3 OCF_t + b_4 GW_t + b_5 PPE_t + b_6 Capex_t + b_7 Risk_t + \varepsilon_t$$

	Pred.	Coeff.	t-value	p-value
Big4_Small	**+**	**0.332****	**2.034**	**0.043**
Return	+	0.699***	2.651	0.008
OCF	+	3.973*	1.956	0.051
GW	?	-0.222	-0.408	0.684
PPE	?	0.127	0.390	0.696
Capex	+	-0.088	-0.062	0.951
Risk	+	0.018	1.455	0.147
Year fixed effects			Yes	
Sector fixed effects			No	
R^2			0.19	
Adj. R^2			0.17	
F			6.66	
p(F)			0.000	
N			316	

*p<.1 (two-sided tests); **p<.05(two-sided tests); ***p<.01 (two-sided tests)

Table 2 reports results from OLS regression. t-values are adjusted for heteroskedasticity.

MtoB = market-to-book ratio of equity (Datastream). *Big4_Small*= 1 if one of the two external auditors is a Big 4 auditor and the other is not, and 0 if both external auditors are Big 4 auditors (Annual report). *Return* = buy and hold return over the fiscal year (Datastream). *OCF* = cash from operations divided lagged by total assets (Datastream). *GW* = goodwill divided by lagged total assets (Datastream). *PPE* = property, plant and equipment divided by lagged total assets (Datastream). *Capex* = capital expenditures divided by lagged total assets (Datastream). *Risk*= 5-year unlevered beta (Datastream).

Table 3 –Auditor Pair Type and Conditional Conservatism

$$X_t = b_0 + b_1 BN_t + b_2 R_t + b_3 BN * R_t + b_4 Big4\_Small_t + b_5 Big4\_Small * BN_t + b_6 Big4\_Small * R_t + b_7 Big4\_Small * BN * R_t + b_8 Size_t + b_9 Leverage_t + b_{10} Risk_t + \varepsilon_t$$

	Pred.	Coeff.	t-value	p-value
BN		-0.017	-0.860	0.391
R	+	0.006	0.276	0.783
*BN * R*	+	-0.022	-0.851	0.395
Big4_Small	?	0.039	0.789	0.431
*Big4_Small * BN*	?	0.019	0.788	0.431
*Big4_Small * R*	?	-0.017	-0.551	0.582
Big4_Small * BN * R	**+**	**0.098**	**1.707**	**0.089**
Size	?	0.010	3.659	0.000
Leverage	?	0.003	0.558	0.577
Risk	?	0.000	-0.123	0.902
Constant		-0.003	-0.102	0.919
Year fixed effects			No	
Sector fixed effects			No	
R^2			0.103	
Adj. R^2			0.073	
F			5.412	
p(F)			0.000	
N			316	

*p<.1 (two-sided tests); **p<.05(two-sided tests); ***p<.01 (two-sided tests)

Table 3 reports results from OLS regression of the Basu (1997) model. t-values are adjusted for heteroskedasticity.

R = Share return measured from 9 months prior to fiscal year-end to 3 months after fiscal year-end. *BN* = 1 if *R* is negative and 0 otherwise. *Big4_Small* = 1 if one of the two external auditors is a Big 4 and the other is not, and 0 if both external auditors are Big 4 auditors (Annual report). *X* = earnings per share scaled by share price at the beginning of the fiscal year. *Size* = natural logarithm of market value of equity (Datastream). *MtoB* = Market-to-book ratio of equity (Datastream). *Leverage* = financial debt minus cash and cash equivalent, divided by market value of equity (Datastream).

Table 4 –Auditor Pair Type and Timeliness of Impairment (Probit)

$$\Pr(DIMP_t) = f(c + b_1 Big\_Small_t + b_2 LowPerf_t + b_3 LowPerf * Big4\_Small_t + b_4 GW_t + b_5 MtoB_t + b_6 Perf_t + b_7 Return_t + b_8 \Delta Sales_t + b_9 Size_t + b_{10} Leverage_t + b_{11} Risk_t + \varepsilon)$$

		(1) LowPerf = ROA < 25th			(2) LowPerf = OCF < 25th			(3) LowPerf = MtoB < 1		
	Pred.	Marginal Eff.	z-value	p-value	Marginal Eff.	z-value	p-value	Marginal Eff.	z-value	p-value
Big4_Small	?	**-0.164****	**-1.980**	**0.048**	**-0.160****	**-1.974**	**0.048**	**-0.106**	**-1.367**	**0.172**
LowPerf	?	-0.256***	-2.809	0.005	-0.183*	-1.850	0.064	-0.053	-0.396	0.692
LowPerf * Big4_Small	+	**0.424*** **	**3.595**	**0.000**	**0.420*** **	**3.629**	**0.000**	**0.399*** **	**2.680**	**0.007**
GW	?	-0.138	-0.646	0.518	-0.080	-0.378	0.706	-0.079	-0.386	0.699
MtoB	?	-0.037	-1.535	0.125	-0.032	-1.349	0.177	-0.025	-1.003	0.316
Perf	?	-0.902*	-1.838	0.066	-0.819*	-1.838	0.066	-0.839**	-2.035	0.042
Return	?	-0.012	-0.146	0.884	-0.007	-0.080	0.936	0.018	0.217	0.828
ΔSales	?	0.065	0.218	0.827	0.200	0.666	0.505	-0.061	-0.210	0.833
Size	?	0.121***	4.292	0.000	0.119***	4.187	0.000	0.112***	3.739	0.000
Leverage	?	0.002	0.051	0.960	-0.021	-0.504	0.614	-0.022	-0.520	0.603
Risk	?	0.003	0.625	0.532	0.002	0.468	0.640	0.000	0.074	0.941
Constant = Pr(DIMP)		0.407**	2.060	0.039	0.407**	2.190	0.028	0.409*	1.750	0.080
Year fixed effects			Yes			Yes			Yes	
Sector fixed effects			Yes			Yes			Yes	
Chi2			59.869***			59.102***			61.979***	
Pseudo R^2			0.178			0.182			0.182	
p(Chi2)			0.000			0.000			0.000	
N			316			316			316	
b1 + b3			**0.260****			**0.260****			**0.293***	
Chi2(1)			5.00			4.96			2.71	
p(Chi2) (two-sided test)			0.025			0.026			0.099	

*p<.1 (two-sided tests); **p<.05(two-sided tests); ***p<.01 (two-sided tests)

Table 4 reports results from probit regression and displays marginal effects. z-values are adjusted for heteroskedasticity.

DIMP= 1 the firm books an impairment, and 0 otherwise (Annual report). *Big4_Small* = 1 if one of the two external auditors is a Big 4 auditor and the other is not, and 0 if both external auditors are Big 4 auditors (Annual report). *LowPerf* = 1 if: (1) EBITDA divided by lagged total assets is below the 25th percentile of the distribution, and 0 otherwise, or (2) cash from operations divided by lagged total assets is below the 25th percentile of the distribution, and 0 otherwise, or (3) market-to-book ratio is below one, and 0 otherwise. *GW* = goodwill divided by total assets (Datastream). *MtoB* = market-to-book ratio of equity (Datastream). *Perf* = EBITDA divided by lagged total assets (Datastream). *Return* = buy and hold return over the fiscal year (Datastream). *ΔSales* = percentage change in total sales (Datastream). *Size* = natural logarithm of market value of equity (Datastream). *Leverage* = financial debt minus cash and cash equivalent, divided by market value of equity (Datastream). *Risk*= 5-year unlevered beta (Datastream). *Constant* indicates the average predicted probability of booking an impairment.

Table 5 –Auditor Pair Type and Transparency of Impairment

$$Score_t = b_0 + b_1 Big4\_Small_t + b_2 LowPerf_t + b_3 LowPerf * Big4\_Small_t + b_4 GW_t + b_5 Float_t + b_6 Risk_t + b_7 Size_t + b_8 Perf_t + b_9 Leverage_t + b_{10} Coverage_t + b_{11} CrossList_t + b_{12} Change_t + \varepsilon$$

		(1) LowPerf = ROA < 25th			(2) LowPerf = OCF < 25th			(3) LowPerf = MtoB < 1		
	Pred.	Coeff.	t-value	p-value	Coeff.	t-value	p-value	Coeff.	t-value	p-value
Big4_Small	?	-2.304	-0.919	0.359	-2.302	-0.911	0.363	-1.584	-0.663	0.508
LowPerf	?	-5.945	-1.447	0.149	-7.414*	-1.970	0.050	-0.143	-0.031	0.976
LowPerf * Big4_Small	**+**	**7.505***	**1.738**	**0.083**	**8.543****	**1.982**	**0.048**	**8.507**	**1.423**	**0.156**
GW	+	9.739*	1.894	0.059	10.271**	1.983	0.048	11.427**	2.137	0.033
Return	?	-0.972	-0.475	0.635	-1.085	-0.530	0.597	-0.236	-0.119	0.905
Dsales	?	-7.018	-0.843	0.400	-5.803	-0.676	0.500	-9.625	-1.181	0.238
Perf	?	-35.447***	-2.936	0.004	-37.307***	-3.092	0.002	-29.894***	-2.606	0.010
Float	?	5.323	1.200	0.231	5.278	1.191	0.235	4.848	1.090	0.277
Size	?	-0.121	-0.108	0.914	-0.192	-0.168	0.867	-0.085	-0.076	0.940
Leverage	?	2.794**	2.041	0.042	2.532*	1.911	0.057	1.987	1.627	0.105
Risk	?	3.199***	2.775	0.006	3.267***	3.044	0.003	2.419**	2.609	0.010
Coverage	?	1.798	0.546	0.585	1.627	0.487	0.627	1.362	0.425	0.671
CrossList	?	4.645**	2.308	0.022	4.431**	2.216	0.027	4.213**	2.169	0.031
Change	-	-5.260	-0.872	0.384	-5.341	-0.877	0.381	-6.248	-1.096	0.274
Constant		41.974***	2.905	0.004	44.004***	2.909	0.004	44.533***	3.134	0.002
Year fixed effects			Yes			Yes			Yes	
Sector fixed effects			Yes			Yes			Yes	
R^2			0.32			0.33			0.33	
Adj. R^2			0.26			0.27			0.27	
F			7.12***			7.17***			6.79***	
p(F)			0.000			0.000			0.000	
N			316			316			316	

*p<.1 (two-sided tests); **p<.05(two-sided tests); ***p<.01 (two-sided tests)

Table 5 reports results from OLS regression. t-values are adjusted for heteroskedasticity.

Score = self-constructed measure of transparency of impairment tests (Annual report). *LowPerf* = 1 if: (1) EBITDA divided by lagged total assets is below the 25th percentile of the distribution, and 0 otherwise, or (2) cash from operations divided by lagged total assets is below the 25th percentile of the distribution, and 0 otherwise, or (3) market-to-book ratio is below one, and 0 otherwise.*Big4_Small* = 1 if one of the two external auditors is a Big 4 auditor and the other is not, and 0 if both external auditors are Big 4 auditors (Annual report). *Float* = percentage of share available to trade (Datastream). *GW* = goodwill divided by lagged total assets (Datastream). *Return* = buy and hold return over the fiscal year (Datastream). *ΔSales* = percentage change in total sales (Datastream). *Perf* = EBITDA divided by lagged total assets (Datastream). *Size* = natural logarithm of market value of equity (Datastream). *Leverage* = financial debt minus cash and cash equivalent, divided by market value of equity (Datastream). *Risk* = 5-year unlevered beta (Datastream). *Coverage* = natural logarithm of the number of recommendations issued by financial analysts during the year (I/B/E/S). *CrossList* = 1 if the company is cross-listed in the US and 0 otherwise. *Change* = 1 if the firm changes external auditor during the fiscal year, and 0 otherwise (Annual report).

Table 6 –Choice of Auditor Pair: First-Stage Treatment Effect Probit Model

$$\Pr(Big4\_Small_t) = f(c + b_1 Inst_t + b_2 Complex_t + b_3 \Delta Assets_t + b_4 CrossList_t + b_5 Foreign\%_{i,t} + b_6 Float_t + b_7 Leverage_t + b_8 Risk_t + b_9 Size_t + b_{10} Perf_t + \varepsilon)$$

	Pred.	Marginal Eff.	z-value	p-value
Inst	-	-0.573***	-3.051	0.002
Complex	-	-0.352***	-2.751	0.006
ΔAssets	?	0.417**	2.463	0.014
CrossList	-	-0.386***	-4.791	0.000
Foreign%	-	-0.194	-1.029	0.304
Float	-	0.687***	3.639	0.000
Leverage	-	-0.092	-1.508	0.132
Risk	-	-0.421***	-5.207	0.000
Size	-	-0.189***	-5.628	0.000
Perf	-	0.719	1.455	0.146
Year fixed effects			Yes	
Sector fixed effects			Yes	
Chi2			162.068***	
Pseudo R^2			0.41	
p(Chi2)			0.000	
N			316	

*p<.1 (two-sided tests); **p<.05(two-sided tests); ***p<.01 (two-sided tests)

Table 6 reports results from probit regression and presents marginal effects. z-values are adjusted for heteroskedasticity.

Inst = percentage of shares owned by institutional investors (Bloomberg). *Complex* = sales divided by lagged total assets (Datastream). Δ*Assets* = percentage change in total assets (Datastream). *CrossList* = 1 if the company is cross-listed in the US and 0 otherwise. *Foreign*% = percentage of foreign sales (Datastream). *Float* =percentage of share available to trade (Datastream). *Leverage* = financial debt minus cash and cash equivalent, divided by market value of equity (Datastream). *Risk* = 5-year unlevered beta (Datastream). *Size* = natural logarithm of market value of equity (Datastream). (Datastream). *Perf* = EBITDA divided by lagged total assets (Datastream).