

Intangible assets on the balance sheet and audit fees

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Abstract This study empirically examines how auditors view intangible assets that are recorded on the balance sheet. Intangible assets have been rising on corporate balance sheets and are growing in importance. In contrast to tangible assets, intangible assets pose unique challenges to auditors in terms judgment and complexity. The study uses a sample of COMPUSTAT firms over the period 2010–2015. The results show that auditors charge higher fees for firms with higher proportion of intangible assets on the balance. This result holds for all intangible assets, goodwill type intangible assets, and intangible assets other than goodwill. For firms with high book to market ratios these results are stronger indicating that potential impairment concerns lead auditors to charge even higher fees for such firms. A variety of sensitivity tests are conducted to verify the robustness of the results. These results are of interest to investors, regulators, firm managers, corporate boards, and auditors.

Keywords Intangible assets · Audit fees · Goodwill · Audit risk · Impairments

Introduction

There has been a steady increase in the proportion of intangible assets on the balance sheets of American companies over the last several decades (Calcibench 2016). Nakamura (2008) notes that investment in intangible

investment expenditures have risen from roughly 4% of U.S. GDP in 1977 to 9–10% in 2006. Given this increase in significance of intangible assets, a growing literature addresses how investors and regulators respond to this changing composition of the corporate balance sheets (Lev and Gu 2016). This study addresses how an important monitor of financial reporting, namely the auditors, view the presence of intangibles on the balance sheet.

Though the issues involved in accounting for intangible assets are similar to those of property, plant, and equipment, an important difference is that the future benefits attribute to intangible assets are usually much less certain than those attributed to tangible assets (Spiceland et al. 2017). U.S.GAAP generally allows companies to record acquired intangibles at purchase price but does not allow capitalization of costs incurred on internally generated intangibles with the exception of legal and filing fees.¹ Auditing of intangible assets poses a different set of challenges than auditing of tangibles assets such as property, plant, and equipment. On the one hand, tangible assets need physical verification which may be time consuming and costly. In contrast, intangible assets do not require extensive physical verifications. On the other hand, it may be relatively easier to ascertain the values of tangible assets while for some intangible assets that are especially complex such as goodwill, valuation is much harder as there is considerable discretion involved. (Ramanna and Watts 2012). Thus, whether auditors would perceive the auditing of intangible assets as involving more effort and more risk compared to other assets is an empirical question.

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¹ An exception to expensing research and development costs on internally generated intangibles is the accounting rule on software development costs (FASB 1985).



The study uses a sample of firms from COMPUSTAT and Audit Analytics over the period 2010–2015 and finds that audit fees are higher for firms with a large proportion of intangible assets on the balance sheet. This result holds for both goodwill and other intangible assets. This relationship is more pronounced for firms with high book to market ratios indicating that auditors may perceive these firms to be of higher risk for overstated values.

Although the economy is becoming more knowledge based and thus the importance of intangible assets has significantly increased, relatively few papers have studied how auditors view the growth of intangible assets on the balance sheet (papers that relate to this area include Shipman et al. 2016 who study the relationship between goodwill impairment and fees; Krishnan and Wang (2014) who study the relationship between software development costs and audit fees). Moreover, the Public Company Accounting Oversight Board (PCAOB) notes significant deficiencies in audit of intangible assets (PCAOB 2015). This study contributes to our understanding of this important area. The study also contributes to the literature on determinants of audit fees, by documenting the composition of assets to be another significant factor in determination of audit fees. In addition, the study shows that valuation of assets to be an important factor in the relationship between audit fees and intangible assets.

The rest of the study is organized as follows: accounting rules and audit procedures pertaining to intangible assets are discussed next, followed by hypothesis development, research design, sample selection, results, additional analyses, and finally summary.

Accounting for intangible assets

Intangible assets, in contrast to tangible assets do not have a material or physical substance. They are usually evidenced by a legal document. There are broadly speaking six categories of intangible assets (Kieso et al. 2016): marketing related intangibles such as trademarks, customer related intangibles such as customer lists, artistic related intangibles such as copyrights, contract related intangibles such as franchise or licensing agreements, technology related intangibles such as patents, and goodwill which is recorded when an entire business is purchased. When intangible assets are purchased they are recorded at cost. If they are internally developed, they are generally expensed. Direct costs, such as legal costs, incurred in developing the intangible assets are capitalized however. Internally generated goodwill is not capitalized. While for some assets such as acquisition of a patent the accounting for intangible assets is relatively straightforward, in other cases such as goodwill or reacquired franchise rights the accounting

issues can be complex (Holder-Webb and Kohlbeck 2006). Goodwill is recorded only when an entire business is purchased and is recognized as the excess of purchase price over the fair market value of the identifiable net assets acquired.² Intangible assets once recorded, are amortized to expense if they have a limited life. They are not amortized if they have an indefinite life (such as goodwill).

Similar to other long term assets, recorded intangibles have to be assessed for impairment when indicators such as a significant change in business climate or the presence of current and projected future losses. In contrast, for indefinite life assets such as goodwill, review for impairment has to be done annually (FASB 2017). The impairment loss is calculated as the difference between carrying value of the asset and its fair value. Note that for goodwill the impairment assessment is conducted at the reporting unit basis.

Audit procedures for intangible assets

For all assets auditors have a set of procedures to perform their auditing responsibilities. These procedures include, among other things, verifying the existence of assets and ensuring that: all transactions pertaining to assets are completely recorded, ownership rights to the assets are well established, and recorded balances appropriately reflect the assets' valuation. When auditing intangible assets, auditors must perform substantive tests to: determine that the intangible assets exist by reviewing appropriate documentation, for example legal documentation; determine that the intangible assets are owned by the organization by inspecting relevant documentation, such as purchase or sales agreement; test management's calculation of any gain or loss on the disposal of intangible assets and determine whether carrying amounts have been properly reduced; inquire management about whether circumstances indicate that the carrying amount of intangibles may not be recoverable (Johnstone et al. 2014). Where such circumstances exist, auditors need to evaluate management's impairment testing and conclusion regarding the writeoff. All these steps could make valuing and auditing the intangibles quite time consuming (Monga 2016).

² An exception to internally developed costs being expensed is software development costs that are incurred after technological feasibility is established but before the product is available for sale to customers (FASB 1985). Software development costs are primarily associated with SIC code 7372 (Mulford and Roberts 2006) and Krishnan and Wang (2014) report only about 188 firms in this industry with software capitalization. Thus software development costs pertain to a small subset of firms with intangibles and more specifically only to a specific industry.



In performing their duties auditors also assess the audit risk involved in the audit process. In audit literature, audit risk is considered a function of inherent, control, and detection risks. A standard auditing text book by Messier et al. (2017) asserts that “the inherent risk associated with intangible assets and goodwill raises serious risk considerations. The accounting rules are complex and the transactions are difficult to audit. Accounting standards require different asset impairment tests for different classes of intangible assets. With the judgement and complexity associated with valuation and estimation of intangible assets and goodwill, the auditor would likely assess the inherent risk as high.” Control risk arises because of absence or failure of controls of the client entity and thus tends to be client specific. To address control risk for intangibles, the auditor has to consider: the experience and expertise of employees who determine the fair value of intangible assets; the assumptions used by the entity in arriving at the value; controls over the process of assessing fair values and whether segregation of duties exist between purchase of assets and valuation of such assets; and the integrity of controls over valuation (PCAOB 2016a). If a specialist had been used by the company to value the intangibles, then the auditor should consider the experience and expertise of the specialist, the assumptions used, and any relationship of the specialist to the client (AICPA 1994).³ Thus both inherent and control risks for intangibles are likely to be significantly high from the audit perspective.⁴ To address this, auditors will have to increase audit effort and resources to ensure an acceptable level of audit risk.

The recognition of intangible assets and their valuation have consistently remained among the important issues not only for auditors but also for the regulatory body that oversees the auditing profession. PCAOB’s Staff Inspection Brief (2016b) on the Observations From 2015 Inspections notes three most frequently identified audit deficiencies during the 2015 inspection cycle, two of which relate to intangible assets: testing estimates arising from the valuation of assets and liabilities acquired in a business combination and evaluating impairment analyses for goodwill and other long lived assets.

³ If a specialist has been used an additional concern is the lack of commonly accepted professional guidelines. To address the issue of concerns over valuation and the need for common ground for generally accepted rules of valuation, the American Institute of Certified Public Accountants (AICPA), American Society of Appraisers (ASA), Royal Institution of Chartered Surveyors (RICS), and The Appraisal Foundation (TAF), along with global valuation leaders from several large accounting firms and the International Valuation Standards Council (IVSC), have been working to develop a new professional credential for business valuation professionals.

⁴ Detection risk is typically considered a residual risk once the auditor assesses inherent and control risks.

Hypotheses development

The discussion on audit procedures for intangibles indicates that while these procedures apply to both tangible and intangible assets, the application of these procedures has some practical differences for intangible assets. Physical verification of an equipment is quite straightforward in contrast to verification of an intangible asset. Some intangible assets such as patents involve verification of legal documents that may not be time consuming (unless there are legal challenges that question the underlying value), while other assets such as goodwill may require significant time and expertise because of the potential complexity of fair value estimates involved in the verification of such assets. This implies that some intangibles may require greater audit effort in terms of verification.

Intangible assets may also differ from tangible assets from an audit perspective in terms of uncertainty over the valuation that may increase audit risk. That is, valuation of intangibles may be less accurate. Using a broad sample of business combinations, McInnis and Monsen (2017) find that there is no significant relation between recorded value of identified intangibles and future operating income. Second, valuation is more complicated for intangibles as significant subjectivity exists and several assumptions by managers need to be verified which may be difficult (Ramanna and Watts 2012). Subjectivity in accounting rules may lead to potential manipulation. A commonly cited earnings manipulation model (Beneish 1999) interprets an increase in the proportion of intangible assets as a potential increase to the probability of manipulation. Third, impairment rules are different for certain intangible assets such as goodwill which have to be assessed for the possibility of impairment every accounting period in contrast to tangible assets that are to be tested for impairment only if certain indicators are present. The use of fair value estimates in arriving at impairments make it even more difficult given that disclosures about how intangibles are valued must offer only basic information about the assumptions that generated these estimates (Sherman and Young 2016).

The discussion on both audit risk and the differences with tangible assets in terms of complexity and subjectivity in valuation, suggest that auditors face elevated levels of challenge both in terms of effort (i.e. verification of asset) and in terms of risk (i.e. valuation of the asset may be overstated) with respect to intangible assets. If such assets require less time-consuming verification or valuation estimates are not difficult to prepare, then auditors may accordingly charge lower fees based on the effort and risk being lower. On the other hand, if either effort, or risk (because of uncertainty over valuation), or



both are deemed high then the auditor would charge higher fees to compensate for the elevated levels of risk and effort. Thus, it is an empirical question whether in the presence of intangible assets, auditors would charge higher or lower fees. Thus, the first hypothesis is stated in the alternate form as:

H1 There is a positive association between audit fees and the proportion of intangible assets on the balance sheet.

There are several reasons why we may observe higher audit fees when a firm has high proportion of intangible assets, such as higher effort for verification, greater uncertainty, risk of overstatement etc. Among these, valuation concerns in particular are deemed a significant audit risk. Ramanna and Watts (2012) argue that accounting for intangible assets and in particular goodwill, accords significant unverifiable discretion to the client managers and thus firms can manipulate the reported numbers using this discretion. They note that the greater uncertainty arises because of uncertainty over future cash flows that depend on several unpredictable factors and moral hazard as the ability to realize the value embedded in the intangible asset is contingent on management's future effort. Given the significant discretion, firms may significantly overstate the value of intangibles on the balance sheet. From the auditor's perspective, this unverifiable discretion poses a significant audit risk as this may not be "auditable." To compensate for this potential unrecognized impairment risk, auditors likely charge higher premiums. Thus, a positive relationship between audit fees and intangibles on the balance sheet is likely primarily because of the heightened audit risk over the valuation of the intangible assets.⁵ Ramanna and Watts (2012) argue that the book to market ratio is a good proxy for identifying potential overstatement of the values of intangible assets such as goodwill. They argue that a book to market ratio greater than 1 indicates goodwill is likely impaired (they use this over a 2 year period). Using this framework, we can assess whether the relationship between audit fees and intangibles systematically varies with the book to market ratio. If auditors

are concerned about overstated intangible asset values as reflected in high book to market ratios and thus perceive a higher audit risk, we should expect the positive relationship between fees and intangibles to be accentuated in such instances. This leads to the second hypothesis (stated in the alternate form):

H2 The positive association between audit fees and the proportion of intangible assets is higher for firms with high book to market ratios.

Research design

The audit fee literature has documented several accounting variables of the client firm as determinants of audit fees (Simunic 1980; Ashbaugh et al. 2003; Li et al. 2017). In line with this literature, the following variables are included: a variable for client size, LAT, defined as natural log of total assets; variables for client risk—profitability, ROA, defined as income before extraordinary items scaled by total assets, LOSS, defined as an indicator variable that equals 1 if income is negative, and 0 otherwise, LEV, defined as total liability divided by total assets, and EXTRA defined as an indicator variable that equals 1 if the firm had extraordinary items, and 0 otherwise, are used; to represent audit complexity, INVREC, defined as sum of inventory plus accounts receivable scaled by total assets, AQC, defined as an indicator variable that equals 1 if the firm undertook a merger and acquisition, and 0 otherwise, NBS defined as the number of business segments, and NGS defined as the number of geographic segments, are used; to represent client's accounting risk, a variable RESTATE defined as an indicator variable that equals 1 if the firm restated its financial statements, and 0 otherwise, and ICWEAK defined as an indicator variable that equals 1 if the firm reported a weakness in its internal controls, and 0 otherwise are used; to represent audit quality the variable BIG4 defined as an indicator variable that equals 1 if the firm's auditor is a Big N auditor, and 0 otherwise is used; to reflect auditor tenure and the empirically observed lower fees in the first year of audit, the variable NEWAUD, defined as an indicator variable that equals 1 if the firm's auditor has been with the firm for 1 year or less, and 0 otherwise is used; to represent busy period posing a capacity constraint for the auditor, the variable FY, defined as an indicator variable that equals 1 if the firm's fiscal year ends on December 31, and 0 otherwise is used.

Following prior literature, a negative sign is predicted on the profitability (ROA) and auditor's first year with the client (NEWAUD) variables. A positive sign is predicted on all the other variables.

⁵ Higher audit fees in the presence of high proportion of intangible assets is consistent with either the auditor expecting to spend more time and effort to audit the intangible assets or the auditor perceiving the intangibles to be a potential audit risk because of incorrect valuation or a combination of both. Jiang and Son (2014) find that auditors adjust both risk premium and audit efforts in response to altered control risk. On the other hand, Coulton et al. (2016) argue that risk rather than effort is a better explanation of higher than expected audit fees. In the context of intangibles, it is quite difficult to empirically test the audit effort explanation as data on number of audit hours spent on various financial statement items is not publicly available nor are measures used in the literature such as audit report delay attributable to the composition of the assets.



The variable of interest in this study is the proportion of recorded intangibles on the balance sheet of the client firm. This is measured in three ways: INTANG, defined as all intangible assets on the balance sheet scaled by total assets; GW defined as goodwill reported on the balance sheet scaled by total assets; and NONGWINT defined as all intangible assets other than goodwill scaled by total assets.

The model is

$$\begin{aligned} \text{LAUDITFEE}_{it} = & a_0 + a_1 \text{LAT}_{it} + a_2 \text{LEV}_{it} + a_3 \text{ROA}_{it} \\ & + a_4 \text{INVREC}_{it} + a_5 \text{LOSS}_{it} + a_6 \text{EXTRA}_{it} \\ & + a_7 \text{NEWAUD}_{it} + a_8 \text{FY}_{it} \\ & + a_9 \text{RESTATE}_{it} + a_{10} \text{BIG4}_{it} \\ & + a_{11} \text{ICWEAK}_{it} + a_{12} \text{AQC}_{it} + a_{13} \text{NBS} \\ & + a_{14} \text{NGS} \\ & + a_{15} \text{INTANG}_{it} \text{ or } \text{GW}_{it} \text{ or } \text{NONGWINT}_{it} \\ & + \text{Industry dummies} + \text{Year dummies} \\ & + e_{it}, \end{aligned}$$

where:

LAUDITFEE = natural log of audit fees;

LAT = natural log of total assets;

LEV = total liabilities divided by total assets;

ROA = income before extraordinary items scaled by total assets;

INVREC = sum of inventory plus accounts receivable scaled by total assets;

LOSS = an indicator variable that equals 1 if income is negative, and 0 otherwise;

EXTRA = an indicator variable that equals 1 if the firm had extraordinary items, and 0 otherwise;

NEWAUD = an indicator variable that equals 1 if the firm's auditor has been with the firm for 1 year or less, and 0 otherwise;

FY = an indicator variable that equals 1 if the firm's fiscal year ends on December 31, and 0 otherwise;

RESTATE = an indicator variable that equals 1 if the firm restated its financial statements, and 0 otherwise;

BIG4 = an indicator variable that equals 1 if the firm's auditor is a Big N auditor, and 0 otherwise;

ICWEAK = an indicator variable that equals 1 if the firm reported a weakness in its internal controls, and 0 otherwise;

AQC = an indicator variable that equals 1 if the firm undertook a merger and acquisition, and 0 otherwise;

NBS = number of business segments;

NGS = number of geographic segments;

INTANG = intangible assets reported on the balance sheet scaled by total assets;

GW = goodwill reported on the balance sheet scaled by total assets;

NONGWINT = intangible assets reported on the balance sheet other than goodwill scaled by total assets.

Sample

All financial statement variables are collected from *COMPUSTAT* for the years 2010 through 2015. Audit fee data are collected from *Audit Analytics*. Observations from *COMPUSTAT* with missing variables in *Audit Analytics* are then eliminated. Consistent with empirical literature in accounting, to minimize the effect of extreme observations, the top and bottom 1% of all the variables are eliminated. This results in 29,960 firm year observations.

Results

Table 1 provides descriptive statistics for the main variables in the study. The average audit fee for the sample is 2.15 million dollars with a median value of 0.66 million dollars. Turning to the primary explanatory variables of interest, the ratio of intangible assets to total assets (INTANG) has a mean value of 12% and a median of 3% indicating that for the average firm, intangibles are a small portion of total assets while a minority of the firms hold substantial intangible assets. Focusing on only goodwill as a proportion of total assets, the mean value is 7% and the median value is 0 indicating that more than half of the firms do not have any acquired goodwill on their balance sheets. Intangible assets other than goodwill as a proportion of total assets has a mean value of 5% and a median value of 1%. For all the other control variables based on audit fee literature discussed before, the univariate statistics are in line with that literature.⁶

Pearson and Spearman correlations (not reported) show that the audit fee variable is significantly (at the 1% level) and positively correlated with all the three ratios—intangibles to total assets (INTANG), goodwill to total assets (GW), and intangibles other than goodwill to total assets (NONGWINT).

The multivariate results for the audit fee model are reported in Table 2. The table reports results for 3 versions of the model based on the type of intangible asset used. In the first version, all intangible assets on the balance sheet as a proportion of total assets are used, in the second version only goodwill as a proportion of total assets is used, and in the third version all intangibles other than goodwill

⁶ Note from Table 1 the maximum values of variables such as ROA and INTANG are quite high. These represent firms that are small and belong to the biotechnology industry. Such firms (BioLargo Inc. 2012; Sevion Therapeutics 2015) have large losses relative to their assets and hold a significant portion of their assets as intangible assets consisting of goodwill and other acquired intangibles. To address extreme values, two procedures are employed: all variables are trimmed at the extreme 1% level in reporting the results and in the sensitivity analysis, winsorization is considered at the 2 and 5% levels.



Table 1 Descriptive statistics

Variable	Mean	SD	Minimum	25%	Median	75%	Maximum
AUDITFEE	2.15	5.77	0.00	0.19	0.66	1.70	144.50
LAT	6.32	2.83	-6.21	4.68	6.55	8.12	15.00
LEV	0.69	0.75	0.00	0.37	0.60	0.87	9.94
ROA	-0.20	1.07	-20.00	-0.04	0.01	0.05	0.50
INVREC	0.24	0.22	0.00	0.06	0.18	0.38	0.80
LOSS	0.35	0.48	0.00	0.00	0.00	1.00	1.00
EXTRA	0.10	0.30	0.00	0.00	0.00	0.00	1.00
NEWAUD	0.05	0.23	0.00	0.00	0.00	0.00	1.00
FY	0.76	0.43	0.00	1.00	1.00	1.00	1.00
RESTATE	0.07	0.26	0.00	0.00	0.00	0.00	1.00
BIG4	0.61	0.49	0.00	0.00	1.00	1.00	1.00
ICWEAK	0.02	0.14	0.00	0.00	0.00	0.00	1.00
AQC	0.24	0.42	0.00	0.00	0.00	0.00	1.00
NBS	1.485	1.15	1.00	1.00	1.00	1.00	9.00
NGS	2.135	2.14	1.00	1.00	1.00	2.00	12.00
INTANG	0.12	0.18	0.00	0.00	0.03	0.18	0.80
GW	0.07	0.13	0.00	0.00	0.00	0.09	0.80
NONGWINT	0.05	0.10	0.00	0.00	0.01	0.06	0.80

Total number of observations equals 29,960 over the period 2010–2015

AUDITFEE audit fees in millions of dollars, *LAT* natural log of total assets, *LEV* total liability divided by total assets, *ROA* income before extraordinary items scaled by total assets, *INVREC* sum of inventory plus accounts receivable scaled by total assets, *LOSS* an indicator variable that equals 1 if income is negative, and 0 otherwise, *EXTRA* an indicator variable that equals 1 if the firm had extraordinary items, and 0 otherwise, *NEWAUD* an indicator variable that equals 1 if the firm's auditor has been with the firm for 1 year or less, and 0 otherwise, *FY* an indicator variable that equals 1 if the firm's fiscal year ends on December 31, and 0 otherwise, *RESTATE* an indicator variable that equals 1 if the firm restated its financial statements, and 0 otherwise, *BIG4* an indicator variable that equals 1 if the firm's auditor is a Big N auditor, and 0 otherwise, *ICWEAK* an indicator variable that equals 1 if the firm reported a weakness in its internal controls, and 0 otherwise, *AQC* an indicator variable that equals 1 if the firm undertook a merger and acquisition, and 0 otherwise, *NBS* number of business segments, *NGS* number of geographic segments, *INTANG* intangible assets reported on the balance sheet scaled by total assets, *GW* goodwill reported on the balance sheet scaled by total assets, *NONGWINT* intangible assets reported on the balance sheet other than goodwill scaled by total assets

as a proportion of total assets is used. After controlling for determinants of audit fees, the *INTANG* variable representing the proportion of all intangible assets on the balance sheet to total assets, is positive and significant (at the 1% level). This indicates that audit fees are higher for firms with higher proportion of intangible assets. In the second version of the model, *GW* which is goodwill as a proportion of total assets is used and that variable is also positive and significant at the 1% level. This indicates that higher the proportion of goodwill on the balance sheet, the audit fees are also higher. Finally, in the third version of the model, *NONGWINT* which is all intangible assets other than goodwill, is used, and that variable is also positive and significant (at the 5% level). This indicates that audit fees are higher for firms with greater proportion of non-goodwill intangible assets. Across all the three versions of intangible assets, the results consistently indicate that fees increase with the proportion of intangible assets on the

balance sheet. These results suggest that either the auditor perceives the intangible assets to involve more audit work or perceives the presence of intangibles on the balance sheet to represent a potential audit risk. The results in the table are consistent with either explanation or a combination of both explanations.

In Table 2, the determinants of audit fees documented in the prior literature are generally significant and the signs on the variables are positive in line with expectations, such as total assets, leverage, restatement, internal control weakness, loss, big N auditor, number of business segments, number of geographic segments and acquisitions.⁷ The signs on return on assets and new auditor are negative in line with expectations and the coefficients are statistically significant. The one exception is *INVREC* representing

⁷ Fields et al. (2004) use goodwill as a proxy for acquisitions and finds that it is positively related to audit pricing using a sample of 277 banks in 2000.



Table 2 Regression of audit fees on the proportion of intangible assets and other control variables

Variables	Coefficient (<i>t</i> -statistic)		
	Model 1 All intangibles	Model 2 Goodwill	Model 3 Non goodwill intangibles
Intercept	9.532 (280.14) ^a	9.538 (282.47) ^a	9.545 (277.66) ^a
LAT	0.435 (101.01) ^a	0.432 (101.01) ^a	0.437 (100.01) ^a
LEV	0.067 (7.49) ^a	0.068 (7.74) ^a	0.071 (8.07) ^a
ROA	-0.056 (-8.47) ^a	-0.057 (-8.59) ^a	-0.053 (-8.06) ^a
INVREC	-0.187 (-4.92) ^a	-0.187 (-4.99) ^a	-0.232 (-6.17) ^a
LOSS	0.137 (9.55) ^a	0.144 (9.98) ^a	0.135 (9.28) ^a
EXTRA	0.028 (0.25)	0.016 (0.04)	-0.002 (-0.02)
NEWAUD	-0.114 (-7.32) ^a	-0.111 (-7.19) ^a	-0.113 (-7.22) ^a
FY	-0.021 (-1.82) ^c	-0.019 (-1.70) ^c	-0.022 (-1.77) ^c
RESTATE	0.047 (2.90) ^a	0.046 (2.80) ^a	0.048 (2.85) ^a
BIG4	0.665 (34.14) ^a	0.665 (34.45) ^a	0.6664 (33.89) ^a
ICWEAK	0.291 (7.48) ^a	0.296 (7.62) ^a	0.294 (7.44) ^a
AQC	0.168 (12.26) ^a	0.158 (11.51) ^a	0.215 (15.40) ^a
NBS	0.122 (13.07) ^a	0.124 (13.17) ^a	0.126 (13.25) ^a
NGS	0.061 (15.07) ^a	0.060 (15.17) ^a	0.060 (14.88) ^a
INTANG	0.366 (9.10) ^a	-	-
GW	-	0.660 (11.26) ^a	-
NONGWINT	-	-	0.131 (2.05) ^b
Adjusted R^2	0.82	0.82	0.82
N	29,960	29,960	29,960

^{a,b,c} Two-tailed significance at the 0.01, 0.05, and 0.10 levels respectively. Huber-White *t*-statistics are reported within parentheses. Industry and year dummies are included—results not reported. Industry-dummy variables are based on eleven Fama–French industries other than money and finance. The dependent variable is the natural log of audit fees. Variable definitions are in Table 1

inventories plus accounts receivable as a proportion of total assets which is expected to have a positive sign as the variable is a proxy for audit risk, but appears with a negative sign. This result appears to be driven by some extreme observations. When this variable is trimmed at the

5% rather than the 1% level as done before, the sign is positive.

To test hypothesis 2, the audit fee regression model is modified by introducing the book to market variable. Recall that Ramanna and Watts (2012) argue that high



Table 3 Regression of audit fees on the proportion of intangible assets, interaction with book to market ratio, and other control variables

Variables	Coefficient (<i>t</i> -statistic)
Intercept	9.593 (282.87) ^a
LAT	0.438 (101.48) ^a
LEV	0.058 (6.57) ^a
ROA	-0.054 (-8.22) ^a
INVREC	-0.119 (-3.17) ^a
LOSS	0.149 (10.39) ^a
EXTRA	-0.003 (-0.04)
NEWAUD	-0.121 (-7.69) ^a
FY	-0.021 (-1.77) ^c
RESTATE	0.052 (3.21) ^a
BIG4	0.640 (33.09) ^a
ICWEAK	0.297 (7.56) ^a
AQC	0.159 (11.65) ^a
NBS	0.119 (12.79) ^a
NGS	0.059 (14.86) ^a
INTANG	0.279 (6.76) ^a
INTANG * HGHBM	0.621 (6.58) ^a
HGHBM	-0.253 (-13.49) ^a
Adjusted <i>R</i> ²	0.82
<i>N</i>	29,960

^a and ^c Two-tailed significance at the 0.01 and 0.10 levels respectively. Huber-White *t*-statistics are reported within parentheses. Industry and year dummies are included—results not reported. Industry-dummy variables are based on eleven Fama–French industries other than money and finance. HGHBM is an indicator variable that equals 1 if the book to market ratio of the firm is in the top quartile of the firms and zero otherwise. The dependent variable is the natural log of audit fees. Variable definitions are in Table 1

book to market ratios are good indicators of potential impairment. Based on their rationale, H2 predicts that for firms with high book to market ratios the association between audit fees and proportion of intangibles is stronger. To test this, an interaction term, INTANG * HGHBM, and an indicator variable HGHBM that equals 1 if the book to market ratio of the firm is in the top quartile of the firms, and zero otherwise are added to the model. The results of this modified model are reported in Table 3.

The variables of interest in Table 3 are INTANG, INTANG * HGHBM, and HGHBM. In this framework, INTANG represents the coefficient on low book to market firms, and the interaction variable INTANG * HGHBM represents the incremental coefficient on high book to market firms. The coefficient on INTANG is 0.279 (significant at 1% level) indicating that even for firms with low probability of impairment fees are positively related to intangible assets. This suggests that concerns other than valuation noted in discussion preceding hypothesis 1 influence audit fees too. The coefficient on INTANG * HGHBM is 0.621 indicating that for firms with high book to market ratios, the positive relationship between fees and intangibles is much more pronounced as seen in the combined coefficient of INTANG and INTANG * HGHBM of 0.9 (significant at 1% level, not reported in the table). This result is in line with the explanation that to the extent high book to market ratios represent higher probability of impairment of intangible assets, auditors are likely to charge higher fees because of the risk that these assets are overstated. When this analysis is conducted separately (results not reported) for goodwill and non-goodwill intangible assets, the interaction term is positive and significant for both type of assets. This result indicates that while several factors lead to higher audit fees for intangibles, the concerns over valuation play a significant role for all major types of intangible assets.

Additional analysis

Current period impairment of intangibles as a potential explanation: One reason that auditors may charge higher fees for intangible assets is that such assets are written down because of impairments during the current accounting period. The impairment itself may be a negative indicator of future prospects and in addition, the impairment may involve additional audit effort given that these are irregular events. For these reasons, auditors may charge higher fees and this may be why the results in Table 2 show that fees are higher for firms with higher intangibles. To address this issue, the model in table with INTANG is



rerun after removing all observations that report an intangible asset impairment during the current year.⁸ The results (not tabulated) show that after removing observations with impairments, the positive and significant relationship between audit fees and INTANG remains significant. This result suggests that current period impairments are not possibly the driver of the result of positive association between audit fees and intangibles.

Proportion of intangibles and subsequent restatements of financial statements: As argued previously, the complexity of verification of some intangibles pose an audit risk and in the extreme the misstatement of intangibles may lead to restating the financial statements. Restatements by clients may lead to litigation and reputational losses for the auditors, both of which are significantly costly (Palmrose 1987). To address the issue of whether a high proportion of intangibles is associated with subsequent restatements, future (subsequent 2 or 3 years) restatements are regressed on the proportion of intangible assets and other control variables (size, profitability, acquisitions, internal control weaknesses, industry and year controls in line with the prior literature (Kinney et al. 2004)). The coefficient on intangibles (or goodwill alone) is positive and significant at the 5% level indicating that subsequent restatements are associated with higher proportion of intangibles or goodwill. These results are consistent with the finding that auditors charge higher fees for firms with high proportion of intangibles because of the additional audit risk. Note that these results should be considered exploratory as restatements can occur many years into the future and other confounding factors may contribute to the restatements over time i.e. intangibles alone may not have caused these restatements. Another way to consider the issue of potential misstatements of intangibles is impairments to such assets in the subsequent years. To address this, future impairments of goodwill are regressed on the current proportion of goodwill and other firm characteristics. Given that COMPUSTAT separately reports the goodwill impairment, it is possible to conduct this analysis directly. The results show a positive and significant (5% level) coefficient on the proportion of goodwill type intangible assets.

Results using changes analysis: The proportion of intangible assets for many firms may not change significantly over time i.e. firms with high proportion of intangibles may stay that way for long periods of time and vice versa. To address whether the results are robust to changes in the proportion of intangible assets, the model is modified in the changes form. That is, the change in audit fees is used as the dependent variable and the change in

proportion of intangible assets is used as the explanatory variable. All other continuous control variables are also converted to change specification. In this modified version, the change in proportion of intangible assets and the change in proportion of goodwill are both positive and significant at the 5% level. The change in the proportion of non-goodwill intangibles, are not significant at conventional levels (p value = 0.15). Overall, these results provide additional support to the robustness of the results in the original fee model.

Non audit fees: Several papers examine whether auditor independence is compromised when auditors receive a significant amount of non-audit fees from the clients (Shipman et al. 2016). The focus of this study is how auditors view the presence of intangibles on the balance sheet in terms of audit effort and risk and thus audit fees are used to study this relationship. Thus, whether non-audit fees compromise auditor independence is beyond the purview of this study.⁹ Winsorization: as seen from Table 1, the minimum or maximum values for some variables are quite large. To address whether such observations have an undue influence on the results, the analysis is conducted by winsorizing the continuous variables at 2 and 5% levels. These procedures produce similar results with one difference, which is the sign on the INVREC variable turns positive.

Lagged values: because audit fees are generally negotiated at the beginning of the period, the information on intangibles available to the auditor is as of the previous year balance sheet. To address this, lagged intangible ratios are used for INTANG instead of current period ratios. The results are similar to those in Table 2.

Summary

The growth of intangibles as a proportion of total assets on the balance sheet has been increasing in the recent years. A growing literature addresses how investors, analysts, and regulators respond to intangible assets on the balance sheet. This study contributes to this literature by examining how external auditors view intangible assets on the balance sheet. The results indicate that auditors charge higher fees for firms with higher proportion of intangible assets that are on the balance sheet, suggesting that auditors view these as potential audit risks and thus requiring more effort. This result applies to both goodwill and other types of intangibles. The association between audit fees and intangibles is more pronounced for firms with high book to market ratios

⁸ COMPUSTAT reports goodwill impairments separately and other impairments as part of Special items. This analysis is conducted by removing both these variables.

⁹ When non-audit fees are used as the dependent variable instead of audit fees, both the proportion of intangible assets and the proportion of goodwill are positive and significant.



indicating that auditors view intangible assets for such firms to be riskier, possibly because of potential overstatement of values. Finally, the results are robust to instances of asset impairments.

These results are of interest to investors, regulators such as the PCAOB, firm managers, corporate boards and auditors. Firm managers and investors would be interested in reducing the costs of audit and may consider necessary disclosures that could mitigate the higher audit cost. Both accounting regulators and auditing regulators, while deliberating on accounting rules for recognition of intangibles may take into consideration whether the revisions would provide more assurance about the valuations and thus lead to lower audit fees. From a governance perspective, board of directors are likely concerned about high audit fees and whether they are an indication of underlying problems in reporting.

Future research can extend these results by looking at whether firms can minimize the higher audit costs by providing appropriate disclosures that signal private information to the auditors and thereby mitigate the valuation concerns.

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