CENTER FOR TAX AND ACCOUNTING RESEARCH

Center for Risk Management

TAXATION, ACCOUNTING, AND FINANCE

TAF WORKING PAPER

No. 88 / November 2023

Acquired intangible assets, CAM disclosures, and audit risk

Liss, Alexander / Riepe, Jan / Sievers, Soenke

PADERBORN UNIVERSITY

www.taf-wps.cetar.org.

Acquired intangible assets, CAM disclosures, and audit risk

Alexander Liss*
Paderborn University

Jan Riepe**
University of Tübingen

Soenke Sievers***
Paderborn University

November 5, 2023

ABSTRACT:

This paper investigates the association between net values of acquired intangible asset classes, their inherent audit risk, and audit fees. First, our findings using a large and hand-collected sample show that acquired intangibles, in general and especially with definite lifetimes, remain less expensive than the alternative accounting treatment: goodwill. Second, and most important, we show that auditors' use of intangible-related critical audit matters (CAMs) moderates this association in a difference-in-differences design. Intangible assets increase audit fees especially in high litigation industries, but intangible-related CAMs moderate the link between intangible assets and audit fees. These results are consistent with the hypotheses that public disclosure of intangible-related CAMs gives the auditor subject-specific protection against audit risks from acquired intangible assets. This, in turn, allows them to reduce audit fees. Overall, these results are important for auditors, standard setters and also inform researchers regarding the risk-reducing effects of CAM disclosures.

Key words: Intangible assets, auditing, business combinations, critical audit matters
JEL Codes: M40, M42, M48
Data availability: Data are available from the public sources cited in the text

Acknowledgements: We thank Christopher Bleibtreu, Christopher Böhme, Simona Caramia (discussant), Maarten Corten (discussant), Holger Daske, Darci Fischer, Nathan Goldman, Jörg-Markus Hitz, Rani Hoitash, Olga Ihl-Deviv'e, Gopal Krishnan, John Christian Langli, Reeyarn Li, Ulf Mohrmann, Jens Müller, Boaz Noiman, Derrald Stice, Tobias Svanstrom, Marleen Willekens, an anonymous referee, and seminar participants at Paderborn University, Open Universiteit Heerlen, the annual TRR 266 conference 2021, the European Accounting Association workshop 2022 in Bergen, the doctoral colloquium at the Fourth Scandinavian Accounting conference in Oslo, and the 2022 EIASM Workshop on Audit Quality for valuable discussions and feedback. Alexander Liss and Soenke Sievers greatly acknowledge funding from the Deutsche Forschungsgemeinschaft (DFG) – Project ID-403041268-TRR 266. We thank Nico Scherer for valuable research assistance. An earlier version of this paper circulated under the title "Auditing Effects of Acquired Intangibles around CAM Disclosures".

* Paderborn University, Department of Taxation, Accounting & Finance, Warburger Str. 100, 33098 Paderborn, Germany, Email: alexander.liss@uni-paderborn.de (**corresponding author**).
** University of Tübingen, Department of Banking, Nauklerstr. 47, 72074 Tübingen, Germany, Email: j.riepe@uni-tuebingen.de.
*** Paderborn University, Department of Taxation, Accounting & Finance, Warburger Str. 100, 33098 Paderborn, Germany, Email: soenke.sievers@uni-paderborn.de.

Electronic copy available at: https://ssrn.com/abstract=4472467

1. Introduction

The capitalization of acquired intangibles assets[1] remains a major focus of debate in financial accounting (e.g. FASB, 2019; IASB, 2020). In business combinations, acquirers identify and estimate the fair values for the target's intangible assets and separate these identifiable intangible assets from goodwill (SFAS 141; ASC 805). Proponents highlight the information value of this separation (Ewens et al., 2019; Gu et al., 2023), while the subjectivity and valuation uncertainty exposes managers and auditors to additional audit risk[2]. Yet, we lack systematic evidence on the audit effects of acquired intangibles, especially beyond the acquisition date. It remains unclear whether and how acquired intangibles with indefinite and definite economic lifetimes are reflected differently in audit fees compared to the goodwill and auditors can benefit from protection against higher audit risk, e.g. from intangible-related critical audit matters (CAM) (Brasel et al., 2016; Kachelmeier et al., 2020).

We investigate the audit effects of acquired intangibles using a unique hand-collected sample of acquired intangible assets with their respective net values from 2009 until 2021. Our sample of 2,358 US-nonfinancial firms allows us to observe the breakdown of acquired intangibles by their economic lifetimes (definite vs. indefinite lifetime) and separates them by their respective classes (*tech*, *customer*, *contract*, and *marketing*)[3]. Moreover, it allows us to investigate the audit effects of acquired intangible assets beyond the acquisition date, which incorporates subsequent fair value measurement. The mean ratio of acquired intangibles to total assets is 7.30 percent (standard deviation 10.3 percent) highlighting the economic importance of this balance sheet item. This ratio

[1] Throughout we use the terms "acquired intangibles" and "acquired intangible assets" interchangeably.
[2] Throughout we use the terms "audit risk" as an umbrella term of the auditor's adverse consequences in cases of auditor litigation- and reputation risk. Thereby, we also include adverse consequences to the auditor's reputation in those cases as discussed in Bell et al. (2001); Simonic and Stein (1996).
[3] Both US Generally Accepted Accounting Principles (US GAAP) and International Financial Reporting Standards (IFRS) propose to distinguish intangible assets among those classes.

Electronic copy available at: https://ssrn.com/abstract=4472467

will continue to rise in the coming years as firms heavily invest in acquiring new technologies such as machine learning and artificial intelligence software such as ChatGPT (Jha et al., 2023).

We measure the audit effects of acquired intangibles through audit pricing and the moderating effects of intangible-related CAMs on the association between acquired intangibles and audit fees. About 9 percent of the observations receive a CAM for their intangible assets, which identify intangibles as a critical position in the audit. Empirically, we examine acquired intangibles as determinants of audit fees in a panel setting (Hribar et al., 2014) and then later exploit the introduction of CAMs as a new audit disclosure mechanism by the auditor towards audit risk for clients, e.g. with high levels of intangibles.

Our results show a positive link between acquired intangibles and audit fees but with heterogeneous effects among different lifetimes and classes. First, acquired intangibles with indefinite lifetimes, which require annual impairment testing (ASC 350-30), show a strong and positive association with audit fees; while definite intangibles, which are subject to amortization, show a weaker but also positive association with audit fees. This evidence is consistent with higher audit risk for auditors but also with more effortful audits attributable to indefinite acquired intangibles and their annual impairment testing. Because acquired intangibles would be subsumed into goodwill if they were not capitalized separately, the comparison between the different coefficients of acquired intangible assets and goodwill puts our results into context. We find that both definite and indefinite acquired intangible assets remain less expensive to audit than goodwill, which provides evidence about potential costs of subsuming more intangibles into goodwill (FASB, 2019; IASB, 2020).

Turning to the detailed findings regarding audit fees and the different intangible asset classes we establish the following findings: Among indefinite acquired intangibles, marketing intangibles, such as trademarks and brands, show the strongest positive associations with audit fees; while

Electronic copy available at: https://ssrn.com/abstract=4472467

indefinite contract intangibles, such as franchises, show no significant association with audit fees. Among definite acquired intangibles, only definite tech intangibles, such as patent and developed technology, show a strong and positive association with audit fees; while other definite acquired intangibles such as customer, contract, and marketing intangibles are not significantly associated with audit fees. This evidence indicates that the claim voiced in comment letters that acquired intangibles are more time-consuming and, consequently, more expensive to audit compared to goodwill seems not to be valid for many intangible asset classes (Clor-Proell et al., 2022).

Based on these results we turn to our main question, i.e., the impact of CAMs on audit fees. We use the introduction of CAMs in 2019 and 2020 (Brasel et al., 2016; Brown et al., 2020; Kachelmeier et al., 2020) in a quasi-natural setting to investigate how the link between acquired intangibles and audit fees changes around the disclosure of intangible-related CAMs. The issuance of (subject-specific) CAMs can give the auditor additional protection when dealing with client audit risk by publicly disclosing and discussing areas of firms that were challenging to audit, subjective to value, and complex.[4]

Descriptively, we find that intangible CAMs are longer than CAMs on tangible assets or other complex accounting issues such as taxes. Furthermore, a content analysis shows that they more often highlight the use of valuation experts consistent with the idea to provide a legal safeguard to the auditor in cases of auditor lawsuits. Turning to audit fees, our results indicate that the auditors react to the perceived reduction in audit risks towards acquired intangibles from the public disclosure of intangible-related CAMs by lowering the fee premium for audits with these intangibles. While we acknowledge that other forces might be at work, we interpret this finding as evidence that audit risk of auditors is most likely to explain our results.

[4] First anecdotal evidence from legal cases provides strong support for the negative link between CAMs and auditor risk through higher litigation risk (see Eaglesham (2023)).

Electronic copy available at: https://ssrn.com/abstract=4472467

Our results remain robust regarding many different specifications. First, we use placebo tests to verify that our moderation effect of CAMs is attributable to CAMs that directly target intangible asset matters and no overall effect that relates to any CAM. Second, we mitigate the effects of potential extreme observations on our results using robust regression designs (Gassen and Veenman, 2021; Leone et al., 2019). Third, firms' selection of the auditor or auditor self-selection can be influenced by the level of acquired intangibles. We mitigate this concern by adding audit-firm fixed effects to the regressions. When using robust regressions or adding audit-firm fixed effects to our main analyses, the inferences do not change with regard to our results. Fourth, we exclude the year 2018 in our identification strategy. In 2018, auditors began to identify client areas where they intended to issue CAMs, but did not disclose this information to the public (Center for Audit Quality, 2018). Even without CAM disclosures in 2018, the dry runs may have affected the auditor-client relationship in terms of audit pricing and in many other dimensions. Results, again, remain qualitatively unchanged, when excluding the year 2018. Fifth, one might argue that the audit process of firms with intangible assets is significantly different to firms that do not have acquired intangible assets driving our results. Put differently, one might argue that we bias our findings in our favor by comparing firms with large intangibles to firms that do not have any intangibles at all. To alleviate these concerns, we re-estimate our results for firm years only, that have positive acquired intangible asset amounts. Results remain qualitatively the same.

Our study provides two major contributions to the literature. First, we contribute to the literature on the overall effects of capitalizing the different classes and lifetimes of acquired intangibles (FASB, 2019; IASB, 2020) by providing evidence on their audit effects. Audit fees are very useful in assessing the audit-level consequences of capitalizing acquired intangibles as inputs into audits. They capture the auditor's perception of a client and the reliability of the client's accounting (Ayres et al., 2019; Francis, 2011; Hribar et al., 2014; Zhang, 2018). In our tests, we

Electronic copy available at: https://ssrn.com/abstract=4472467

use the association between audit fees and goodwill as our benchmark because the subsuming of the acquired intangibles into goodwill is the most obvious alternative accounting treatment.[5] Our results are informative about partially subsuming different acquired intangible assets into goodwill, as discussed by FASB (2019) and IASB (2020). Subsuming all acquired intangibles into goodwill arguably results in an unambiguous decrease in audit workload, as fewer different asset categories would need to be audited. However, an accounting item that comingles all different types of intangibles assets might require at least the same amount of work by the auditor to still determine the correct impairment amount and calculate potential offsetting effects. Furthermore, the consequences on audit risk is unclear. In additional tests of Table 7, we find that firms with acquired intangibles do not pay a higher, but a lower audit fee premium on the goodwill compared to firms that do not carry any acquired intangibles. This result, once more, is consistent with the idea that the audit risk channel drives the acquired intangible audit fee premium.

Second, and most importantly, we also contribute to the young and growing literature on the disclosure of CAMs. Prior literature provides partially conflicting evidence showing some market (Klevak et al., 2023) and disclosure effect (Burke et al., 2023) of CAMs. Klevak et al. (2023) shows that firms with more extensive CAM disclosures are associated with increased perceived uncertainty. We contribute to this literature by showing that auditors can also use CAMs to mitigate their audit risk. For instance, KMPG faces severe litigation cases after failing to issue a CAM for the rising risks in the deposit position of the Silicon Valley bank (SVB).[6] Moreover, Brasel et al.

[5] Our study extends the findings by Datta et al. (2020) among several dimensions. First, we investigate the audit effects of acquired intangibles with different economic lifetimes and classes. Because acquired intangibles combine very heterogeneous asset classes and are partially subject to the impairment-only approach and partially to amortization, disaggregated information on acquired intangibles allows us to uncover effects that are averaged when only considering the aggregated amount of all intangibles, and inform the current debate in standard setting FASB (2019).

[6] In the 2023 lawsuits (City of Hialeah Employees' Retirement System vs. Becker et al. (2023) Case 3:23-cv-01697), KPMG was sued, among others, for the lack to "*identify risks associated with SVB's declining deposits or SVB's ability to hold debt securities to maturity*" as a CAM. For an excerpt of the original text from the filing, see Online Appendix OA6.

Electronic copy available at: https://ssrn.com/abstract=4472467

(2016) provide theoretical and early experimental evidence on the protective effects of CAM disclosures on auditors' litigation risk in cases of undetected fraud. Brown et al. (2020) and Kachelmeier et al. (2020) show that area-specific CAM disclosures reduce the jurors' assessment of the audit firm's culpability in lab experiments. The effects are concentrated on CAMs in the areas that involve high measurement uncertainty (Kachelmeier et al., 2020) and are consequently well suited to inform our investigations in the context of acquired intangibles.[7] Nevertheless, Li and Luo (2023) and Reid et al. (2019) show a positive effect of the number of CAMs on the overall level of audit fees. We complement the literature by showing how the disclosure of intangible-related CAMs moderates the link between the acquired intangibles and audit fees. Thereby, our empirical evidence based on archival data strongly supports earlier experimental evidence by Brasel et al. (2016), Brown et al. (2020), and Kachelmeier et al. (2020). Furthermore, our results reconcile the theoretical and experimental findings with partially contradicting archival evidence from Li and Luo (2023) and Reid et al. (2019) by showing that it is not necessarily the direct effect on audit fees but the area-specific premium on audit fees that is affected by area-related CAM disclosures.

2. Institutional framework and hypotheses: The different acquired intangible assets

2.1 Institutional framework

Acquired intangible assets and their assurance differ from other assets on the balance sheet in significant ways. In general, standard setters define intangibles as nonfinancial assets that lack physical substance (ASC 350, IAS 38). Although many internally generated intangibles such as research and development (R&D) and advertising expenditures are expensed when incurred,

[7] The international evidence from other legislations and institutional environments is less clear. Reid et al. (2019) do not find a direct link between the reporting requirements of auditors in the United Kingdom, which are arguably similar to the CAM disclosure, and the firms' overall audit fees. Nevertheless, auditor litigation risk in the UK substantially differs from that in the US.

Electronic copy available at: https://ssrn.com/abstract=4472467

acquired intangibles from individual transactions or business combinations are capitalized on the statement of financial position and amortized or tested for impairment over time. The issuance of SFAS 141 and SFAS 142 in 2001 changed the accounting standards for acquired intangibles. These standards heavily affected the auditing processes of firms, since billions of intangible assets have been added to acquiring firms' balance sheets (Landsman et al., 2021; McInnis and Monsen, 2021). The accounting treatments of intangibles in SFAS 141 and SFAS 142 have remained largely constant since 2001 in which they mandate that acquirers capitalize acquired intangibles under the purchase method. But in 2007, the FASB revised the reporting and disclosure requirements regarding the accounting for business combinations (Andrews et al., 2009). SFAS 141R mandates that acquiring firms capitalize in-process R&D as an indefinite intangible asset until the completion or abandonment of the purchased R&D project.[8] Currently, both the FASB and IASB continue debating whether the accounting for acquired intangibles should be updated given their rising importance to firms' balance sheets (Landsman et al., 2021).

For acquired intangibles from business combinations, acquirers must identify and estimate fair values of the target's assets. Acquired intangibles are identifiable when they are contractible (contractual or legal criterion) or separable from the entity (separability criterion) (ASC 805 and 820). A purchased trademark is an identifiable intangible asset because it is contractible given its legal nature and can be sold separately. In contrast, merger synergies are not identifiable as acquired intangibles because they are not contractible and cannot be separated from the firm. Both the FASB and the IASB specify five different classes of intangibles in their framework: *tech*, *customer*,

[8] In 2014, the FASB relaxed the accounting of acquired intangibles for private firms only due to high costs (*ASU No. 2014-18*). In particular, they allowed the subsuming of customer intangibles and non-compete agreements into goodwill, and goodwill can either be amortized or be subject to annual impairment testing. Because our sample covers only publicly listed firms, these changes do not affect the accounting treatment for our sample.

Electronic copy available at: https://ssrn.com/abstract=4472467

contract, *marketing*, and *artistic*. A detailed explanation with examples for each of the different classes of acquired intangibles is provided in Online Appendix OA5.

When recognized, acquirers have to determine the useful economic lifetimes of acquired intangibles (ASC 350). Usually, the economic lifetime is the period during which an intangible asset is expected to contribute to the acquirer's future cash flows (Reilly and Schweihs, 2014). For acquired intangibles, the economic lifetime, either definite or indefinite, can be assessed through their legal, regulatory, or contractual duration, or their expected uses (ASC 350-30-35-3). Figure 1 shows the development of acquired intangibles as a share of property, plant and equipment (PPE) over time. It illustrates that the importance of acquired intangibles compared to more classic assets, such as PPE, has substantially increased for both acquired intangibles with definite as well as indefinite economic lifetimes.

[insert Figure 1 around here]

For acquired intangibles with a definite economic lifetime, such as customer contracts with a fixed term or patents with an expiration date, the firm amortizes these assets over their remaining lifetime (for a more detailed description, see Reilly and Schweihs (2014)). In the case of unforeseen events or circumstances, definite intangibles are also tested for impairment when an impairment may be probable (ASC-360-10-35-21). In contrast to goodwill impairments, testing impairments for definite intangibles is carried out on an asset group level.

Indefinite acquired intangibles, on the other hand, have an undetermined economic lifetime and are subject to annual impairment testing instead of amortization. Common examples of these intangibles are licenses and trademarks. Such as a goodwill impairment test, the impairment test for indefinite intangibles consists of the same steps where the fair value of the underlying intangible asset is compared with the carrying amount. Therefore, an impairment loss is recognized when (1) the carrying amount of an acquired intangible asset is not recoverable and (2) the carrying

Electronic copy available at: https://ssrn.com/abstract=4472467

amount of an indefinite acquired intangible asset exceeds its fair value. Because intangibles typically lack market benchmarks, the impairment test of their carrying amounts involves managerial discretion and a substantial amount of judgement, which makes indefinite acquired intangibles similar to other level 3 fair value measurements, for example, financial instruments (for more detailes, see Beatty and Weber, 2006; Ettredge et al., 2014).

2.2 Hypotheses development

The assurance of acquired intangibles resembles that of other complex fair value measurements (FVM) in that it is highly demanding and bears multiple risks for the auditor (Cannon and Bedard, 2017; Datta et al., 2020; Ettredge et al., 2014; Griffith, 2020). Acquired intangibles are carried on firms' balance sheets at the lower of their historical costs and their FVM. With the FVM, auditors are most concerned about whether that value is close to or even drops below its carrying value. The FVM of intangibles often lack reliable market benchmarks but frequently rest on internal valuations models without market inputs (level 3 FVM, henceforth L3FVM) resulting in very demanding auditing task. Online Appendix OA7 provides three examples of accounting related lawsuits that center around the accounting treatment of intangible assets. In particular, they underline the inherent audit risk associated with acquired intangible assets.

The Public Company Accounting Oversight Board (PCAOB) requires auditors to adapt procedures to the client's risks of material misstatements (PCAOB AS 2301) and thereby puts a special focus on accounting estimates, such as L3FVM (AS 2501)[9]. The auditor should perform at least one of three substantive procedures, either individually or in combination: (a) *Test the firm's process used to develop the accounting estimate;* (b) *develop an independent expectation for*

[9] Previously, AS 2501 together with AS 2502 outlined the auditors' requirements. In 2019, the PCAOB issued a revised AS 2501 that also includes requirements previously included in AS 2502.

Electronic copy available at: https://ssrn.com/abstract=4472467

comparison to the firm's; or (c) *evaluate audit evidence from events or transactions occurring after the measurement date related to the accounting estimate for comparison to the firm's estimate* (PCAOB AS 2501). Although the auditor is only required to use one of the approaches, most auditors rely on at least two of them in cases of the L3FVM (Glover et al., 2017).

Both the more extensive audit effort as required by the PCAOB and the higher audit risk of intangibles for auditors is associated with higher fees required by the auditor (Hribar et al., 2014; Mohrmann et al., 2019). The auditor can potentially reduce parts of the premium on audit risk by inducing more effort through longer hours (Bell et al., 2001; Zhang, 2018) or relying more on valuation specialists (external or in-house). Nevertheless, valuation specialists reduce audit risk only partially as the audit is primarily the partners' responsibility (Glover et al., 2017; Griffith, 2020). Furthermore, the L3FVM has highly uncertain and subjective estimations that rely on significant and complex assumptions (Kanodia et al., 2004). Further, these estimations come from multiple valuation techniques (Cannon and Bedard, 2017) that are somewhat difficult to objectively verify, even if the audit effort is very high. Hence, it is unclear whether auditors in the context of intangibles can efficiently reduce risk by increasing the effort put into the audit given the complexity of the models (Bratten et al., 2013; Cannon and Bedard, 2017; Christensen et al., 2012; Martin et al., 2006).

For these reasons, our first hypothesis predicts in alternative form:

Hypothesis 1: The acquired intangibles are positively associated with audit fees.

Within the group of intangibles, the economic lifetime heavily influences the audit risk of auditors, as well as their effort required to perform an adequate assurance. Most intangibles show a definite (legal or economic) lifetime. Acquired intangibles with a definite lifetime are amortized over their respective economic lifetime and only show additional impairments at unforeseen events and circumstances (ASC 350). The predetermined amortization scheme decreases the definite

Electronic copy available at: https://ssrn.com/abstract=4472467

intangibles' carrying values mechanically over time. Thereby, these assets become economically less relevant and an impairment becomes less likely. In sum, definite intangibles will be easier to audit than indefinite intangibles.

In contrast to definite acquired intangibles, indefinite ones have a useful lifetime, which is either unlimited or at least not specified at the reporting date. Just like the impairment test for goodwill, impairment tests for indefinite intangibles are based on subjective and complex assumptions that require managerial discretion (Koonce et al., 2021; Shalev et al., 2013). The assurance of indefinite acquired intangibles requires the auditor to test the subjective assumptions of management every year and, consequently, exposes the auditor to audit risk in every reporting period.

On the one hand, one can expect that the impairment test for indefinite intangibles to show the same attributes as the goodwill impairment test. That means that annual impairment testing requires the same audit effort for goodwill because of their highly subjective valuations and untimely recognition of impairment losses. These losses could cause additional audit risk. On the other hand, indefinite intangibles such as trademarks can be valued more easily because their projected cash flows are easier to quantify.

For these reasons, we separate our expectations into two hypotheses:

Hypothesis 2.1: Definite acquired intangibles are less associated with audit fees than goodwill.

Hypothesis 2.2: Indefinite acquired intangibles are less or equally, but not more associated with audit fees than goodwill.

The auditor can use different measures that reduce its audit risk (Carcello and Palmrose, 1994; Krishnan and Krishnan, 1997; Seetharaman et al., 2002; Venkataraman et al., 2008). The introduction of critical audit matters (CAM) provides a unique and new measure for the auditor to

Electronic copy available at: https://ssrn.com/abstract=4472467

publicly disclose its matter-related audit work. We argue that the public disclosure of intangible-related CAMs also discourages lawsuits against the auditor even if this is not its main purpose. Starting in 2019 and 2020, auditors could publicly express subject-specific CAMs. With the introduction of CAM reporting, the auditor informs the public about relevant areas that were especially challenging, subjective, or complex to audit (PCAOB Release No. 2017-001) and that might deserve more attention from investors. Because CAMs express the auditor's concerns in a specific area that is considered as judgmental and complex but not necessarily incorrect, CAMs help the auditor to document the awareness and potential measures in these areas (Carcello and Palmrose, 1994 make a similar case for modified audit opinions). Anecdotal evidence for the link between CAMs and audit risk also comes from the 2023 lawsuit against KPMG after they failed to identify the relevant CAMs for the Silicon Valley Bank (Eaglesham, 2023). Appendix B provides a real-world example of how Ernst & Young LLP (EY) documented awareness of CAMs for the acquired intangibles of Walmart Inc. in 2021. EY also informed the shareholders on how (substantially) it addressed these matters in their audit and made clear that it had conducted the appropriate and substantial procedures necessary.

CAMs might provide valuable protection against audit risk (Brasel et al., 2016; Kachelmeier et al., 2020; Vinson et al., 2019) from intangibles that are hard-to-verify and complex nonfinancial assets and require the L3FVM (Kachelmeier et al., 2020). Brasel et al. (2016) show that relative to stating there were no CAMs, their disclosure provides litigation protection in cases of undetected fraud. Kachelmeier et al. (2020) show that the auditor's litigation risk decreases especially in CAM areas that involve highly uncertain measurement such as valuations of intangibles. Burke et al. (2023) show that CAMs also improve the overall reporting quality by inducing better and more detailed managerial disclosure on the CAM area that helps inform the market. Brown et al. (2020),

Electronic copy available at: https://ssrn.com/abstract=4472467

in contrast, focus on the audit firm's culpability and show that subject-specific CAM disclosures substantially reduce the jurors' assessments of that culpability.

Nevertheless, the issuance of CAMs can also come with costs for both the auditor and firms. Similar to other adverse disclosures by the auditor about the firm's financial statements (Bleibtreu and Mohrmann, 2019; Carcello and Neal, 2003; Krishnan, 1994; Vanstraelen, 2003), the excessive disclosure of CAMs might induce firms to subsequently change their auditor. Furthermore, removing subject-specific CAMs can increase the audit risk for these subject areas of the audit in subsequent years (Vinson et al., 2019). Therefore, auditors might have an incentive not to communicate critical accounting positions, such as acquired intangibles, to the public. Overall, the impact of the CAMs regarding the effect of acquired intangibles on audit fees is an empirical question.

Our third hypothesis predicts in alternative form:

Hypothesis 3: If audit firms publicly disclose critical audit matters about acquired intangibles, then the audit fee premium for acquired intangibles will decrease.

3. Research design, sample selection, and data description

3.1 Research design

To test our three hypotheses, we estimate two different specifications: an audit fee model to determine how acquired intangible assets differ in their pricing and an identification strategy around the critical audit matter (CAM) concerning intangibles to identify the impact of CAMs on the relation of acquired intangibles and their audit pricing.

3.1.1 The audit fee model

We estimate the associations between acquired intangibles (goodwill) and audit fees using a linear regression model with controls for the client and client-auditor-engagement factors that other studies have established to determine audit fees (Hribar et al., 2014; Zhang, 2018). We use a one-

Electronic copy available at: https://ssrn.com/abstract=4472467

stage approach and include all variables in a single regression similar to Zhang (2018) because the use of regression residuals as dependent variables pose several challenges when the estimation errors are large (Chen et al., 2018).

We estimate equation (1) as pooled-OLS model with industry (Fama-French 48 industry) and year fixed effects with standard errors clustered at the firm level (Petersen, 2009). Later, we test the robustness of our results using a robust regression design (Leone et al., 2019) and including audit-firm fixed effects.

Thus, we estimate the following model (variable definitions can be found in Appendix A):

$$Ln(AuditFee) = \beta_0 + \beta_1 Acquired\_Int_{i,t} + \beta_2 Goodwill_{i,t} + <Controls> + Industry\ \&\ Year\ Indicators + e_{i,t} \quad (1)$$

where the natural logarithm of the audit fees (*LnAuditFee*) is the dependent variable.

The total amount of acquired intangibles (*Acquired_Int*) is our main independent variable of interest. We scale acquired intangibles by total assets to allow for a better comparison of the coefficients and to mitigate scaling effects. Furthermore, we break down acquired intangibles by their economic lifetime (*Def_Int, Indef_Int*) for the tests of hypothesis 2 and by their respective classes (*Share Tech Indef, Share Contract Indef, Share Tech Def, Share Customer Def, Share Contract Def, Share Other Intangibles*). We compare the coefficients for the different measures of acquired intangibles with the coefficient for the firms' amount of goodwill that is scaled by total assets (*Goodwill*).

We control for the other drivers of audit fees from the literature (Ayres et al., 2019; Badertscher et al., 2014; Hribar et al., 2014; Minutti-Meza, 2013; Zhang, 2018). We especially control for the natural logarithm of sales[10] (*Size, Employees*), the profitability (*ROA*), the cash ratio (*CashR*), the

[10] Results remain qualitatively unchanged, if we use the natural logarithm of total assets (Hay et al. (2006)) instead of sales to capture firm size. Because we scale many control variables by total assets, the natural logarithm of sales might yield more robust results.

Electronic copy available at: https://ssrn.com/abstract=4472467

sales growth (*SalesGrowth*), the current ratio (*CurrentR*), the share of foreign sales (*Foreign*), leverage (*Leverage*), and loss years (*Loss*). We also control for firms' smoothing incentives (*Smooth*), mergers and capital issuances activities (*Merger; IPO; SEO*), the value of inventory and receivables (*InvRec*), the special items (*Special Items*), firm's complexity (*BusinessSegment*), a television industry indicator (*TV_Industry_Ind*)[11], the market valuation (*BTM*), and restatements (*Restatement*). We further control for auditor and audit-process related factors, such as the ratio of non-audit fees (*NAF*), the Big 4 and industry expert auditor (*Big_N; IndLeader_Fee*), December fiscal year-end (*Busy Season*), the audit opinion (*Audit Opinion*), the audit timeliness (*AuditTimeliness*), internal control weakness (*WEAK_404*), the litigation environments from Francis et al. (1994) (*Litigation*), and previous accounting-related lawsuits (*PrevLawsuits*). To mitigate the effect of extreme observations, we winsorize our dependent and independent variables on the 1st and 99th percent levels.

In additional tests, we also interact our main independent variable, either the total amount of acquired intangibles (*Acquired_Int*) or the acquired intangibles with a definite or an indefinite economic lifetime (*Def_Int, Indef_Int*), with the number of accounting-related lawsuits in the 12 months after the annual report had been published as our main proxy for higher audit risk. Because we obtained data on all ongoing lawsuits and some last for many years, we take the change in the ongoing lawsuits to better capture the change in audit risk that relate to the current accounting numbers.

3.1.2 Identification strategy

[11] Among television broadcasters, FCC licenses, which are an indefinite intangible asset, are the most important asset and are more liquid than other intangible assets in other industries. Therefore, they appear to be better audited and therefore would distort our average results. We estimated our results without this industry and get the same inferences.

Electronic copy available at: https://ssrn.com/abstract=4472467

To alleviate potential endogeneity concerns, we use the introduction of CAMs as an identification strategy. Prior to the CAM introduction, auditors only had limited abilities to communicate critical positions to the public. The introduction of CAMs provided the auditor a new tool to guide the public's attention to the reporting areas of firms that were challenging to audit, subjective to value, and complex, such as acquired intangible assets.

In our research design, we use a triple interaction with our main independent variables to exploit the first-time disclosures of CAMs in 2019 and 2020. Therefore, we interact them with a static and binary variable that takes the value of one if the firm received a CAM in 2019 or 2020 for its acquired intangibles (*CAM_int*) as our first interaction, and also interact it with an indicator variable (*Post*) for the years after the CAM had been disclosed. We follow deHaan et al. (2023) and estimate our model with interaction effects for each control variable to control for unobserved heterogeneity. Below, we estimate the following regression in a difference-in-differences design:

$$\begin{aligned} Ln(AuditFee_{it}) = {} & \beta_0 + \beta_1 Acquired\_int_{i,t} \times CAM\_int_i \times Post_t + \\ & \beta_2 Acquired\_int_{i,t} \times CAM\_int_i + \beta_3 CAM\_int_i \times Post_t + \\ & \beta_4 Acquired\_int_{i,t} \times Post_t + \beta_5 Acquired\_int_{i,t} + \beta_6 CAM\_int_i + \beta_7 Post_t + \\ & \beta_8 Goodwill_{i,t} + <Controls> + Industry\ \&\ Year\ Indicators + e_{i,t} \end{aligned} \quad (2)$$

All control variables are the same as those in equation (1). Again, we cluster our standard errors by firm.

3.2 Sample and descriptive statistics

We construct our sample by first obtaining accounting and audit data from Compustat and Audit Analytics for the period from 2009 to 2021. Our sample begins in fiscal year 2009 to keep the reporting and disclosure requirements of acquired intangibles fixed (Andrews et al., 2009). We require firms to have non-missing equity book values, total assets, net income, date of the signature

Electronic copy available at: https://ssrn.com/abstract=4472467

by the auditor, and audit fees. Additionally, we exclude firms with market values of equity of less than USD one million. We also restrict our sample to nonfinancial firms because the auditing for financial firms such as banks and insurance firms differs substantially (Ettredge et al., 2014; Hribar et al., 2014) and we exclude firm years with audit delays of more than 365 days because the audit delays most likely refer to audit revisions and not to the initial audit.

Lastly, we retain data on the CAMs from Audit Analytics. In the US, firms marked as accelerated filers could receive a CAM from their auditors starting in 2019, while smaller firms could receive CAMs starting in 2020. We identify intangible-related CAMs when CAM topics in Audit Analytics are marked as "Intangible assets" and "Goodwill and intangible assets". We also include CAMs with the topic "long-lived assets", when they contain information about critical intangible asset positions.[12] We manually verify each intangible-related CAM to make sure that it contains information on the acquired intangibles that have been capitalized on the balance sheets. Appendix B contains an example of an intangible-related CAM for Walmart Inc. (2021).

We combine these data sources with the hand-collected database from Landsman et al. (2021). This database contains the *net amounts* of acquired intangibles from the notes of annual financial statements obtained from the SEC Edgar webpage. Online Appendix OA3 provides an example of a disclosure of acquired intangibles for Amazon Inc. (2017). The sample comprises the firms with the largest market capitalizations and covers at least 50% market capitalization in each of the Fama-French 12 industries. More details on the collection process can be found in Landsman et al. (2021).

Panel A of Table 1 presents our sample composition. Our main sample contains of 18,931 firm-year observations of 2,358 firms.[13] Industries with the largest concentrations of firm-year

[12]Audit Analytics sometimes categorizes CAMs for both tangible and definite intangible assets under the category "long-lived assets". To identify intangible-related CAMs within this category, we follow a two-step procedure. In the first step, we identify CAMs about intangible assets using text word searches for the words "intangible assets" and "intangibles". In the second step, we manually verify each CAM to make sure that each intangible-related CAM identified is indeed about acquired intangible assets.

[13] For example, in 2017, our sample represents more than 65% of total market capitalization of the US stock market.

Electronic copy available at: https://ssrn.com/abstract=4472467

observations are Equipment firms (19.87%), Service firms (13.91%), Health firms (13.22%), and Shop firms (12.32%).

[insert Table 1 around here]

Panel B presents the descriptive statistics of our acquired intangible variables. Our descriptive results confirm the evidence in Figure 1 that definite acquired intangibles are more common than indefinite acquired intangibles. Regarding the classes, we find that definite tech, definite customer, and indefinite marketing are the most common classes of acquired intangibles on balance sheets. Nevertheless, the results indicate that acquired intangibles are concentrated in bigger firms. In our smaller sample, we use only the years around the introduction of the CAMs, that is, 2015 to 2020. The industry distribution and the major descriptive statistics remain qualitatively similar. Appendix A provides the definition of each variable. All variables are in line with prior research (Ayres et al., 2019; Badertscher et al., 2014; Hribar et al., 2014; Minutti-Meza, 2013; Zhang, 2018).

4. Results

4.1 Acquired intangible assets and audit fees

As a first step, we test hypotheses one and two, i.e., we investigate the association between acquired intangibles and audit fees. As a second step, we test hypothesis three, i.e., we investigate the conditional effect of audit risk on the association between acquired intangibles and audit fees. We use the change in the logarithm of one plus the actual accounting-related lawsuits (#AccLawsuits) within the next twelve months as our main proxy for audit risk. The number of lawsuits may indicate the severity of audit risk apparent within a firm. Table 2 shows the multivariate results from estimating equation (1). All uneven columns display the overall effects and all even columns show the conditional effects for high audit risk.

In columns (1) and (2) of Table 2, we start by looking at the association of the overall level of acquired intangibles (*Acquired_Int*). In columns (3) and (4), we separate the overall level of

Electronic copy available at: https://ssrn.com/abstract=4472467

acquired intangibles into either those with an indefinite (*Indef_Int*) or those with a definite economic lifetime (*Def_Int*). We predict in hypothesis 2 different effect strengths of acquired intangibles in their audit pricing based on their economic lifetime. In columns (5) and (6), we further test whether within the indefinite and the definite acquired intangibles there is effect heterogeneity regarding the underlying intangible asset classes. For doing so, we follow the approach by Goncharov et al. (2014) and include the relative share of the different intangible assets classes on the total acquired intangibles as additional variables. We use the share of marketing intangibles as our reference group because this class of intangible assets contains similar assets within the intangible assets with definite and indefinite lifetimes (see Online Appendix OA5). This division allows us to investigate differences within pricing of the acquired intangibles in firms' audit fees.

We find a positive and statistically significant relation between the overall level of acquired intangibles and audit fees in columns (1) of Table 2. With a coefficient of 0.336 [p-value < 0.01], a one standard deviation increase in *Acquired_Int* results in an increase in the firm's audit fees by four percent. This effect yields strong support for hypothesis 1 and shows that firms' net amounts of acquired intangibles have significant and sizable audit effects. Comparing the effect of *Acquired_Int* with that of *Goodwill* in additional tests, we find that the regression coefficient of acquired intangibles is only about half the size of that from the goodwill (0.336 compared to 0.611) and is also statistically significantly lower than *Goodwill* at the 5 percent level [H_0: coef $_{Acquired\ Int}$- coef $_{Goodwill}$ >= 0.275; p-value = 0.018]. In economic terms, this translates into an increase of the audit fees by 4.0 percent per one standard deviation increase in intangible assets compared to an increase of 8.6 percent if the same assets would be subsumed under goodwill. This difference is economically significant and meaningful. From this additional test, we find that auditors price goodwill and intangibles differently and charge lower premiums for intangibles compared to

Electronic copy available at: https://ssrn.com/abstract=4472467

goodwill. In column (2) of Table 2, we find a significantly higher audit fee premium for intangible assets in case of higher audit risk [coefficient on the interaction term= 0.126; p-value < 0.05]. Overall, the results from columns (1) and (2) of Table 2 show that auditors charge higher fees for auditing acquired intangibles and audit risk associated with intangibles further increases audit fees.

When splitting up the intangible assets by their economic lifetime in columns (3) and (4), we find that the coefficients for both *Indef_Int* and *Def_Int* show positive and statistically significant associations with audit fees. More importantly, both coefficients show distinct magnitudes with definite intangible assets (0.331) being cheaper to audit than indefinite intangible assets (0.420). The results point towards differing efforts and risks in the audit regarding acquired intangibles with definite and indefinite economic lifetimes. This evidence is also consistent with indefinite intangible assets, which are subject to annual impairment testing, are being harder to audit than definite intangibles, which are amortized. Again, *Goodwill* possesses the largest coefficient (0.606) underlining that auditing is the goodwill more complex than auditing acquired intangibles. In additional tests, we find that definite intangible assets are significantly different from goodwill (p-value < 0.1) and the difference between indefinite intangible assets and goodwill remains just below conventional significance levels (p-value =0.125). In column (4), we see once more that the effect is heavily driven by firms' audit risk. In economic terms, the effect of column (3) [4] translates into an increase of the audit fees 3.5 percent for one standard deviation of indefinite intangible assets and 2.7 percent for one standard deviation increase in definite intangible assets compared to an increase of 5.7 percent increase if each of those amounts would be subsumed under goodwill. This result is consistent with amortized assets being less difficult and risky to audit than the annual impairment test of the goodwill. In sum, we find strong support for hypotheses 1 and 2.

[insert Table 2 around here]

Electronic copy available at: https://ssrn.com/abstract=4472467

In columns (5) and (6), we see that the coefficient of the indefinite intangibles further increases if we allow for the separate factor loadings of the different intangible classes. The share of tech indefinite acquired intangibles (e.g. in-process R&D) shows no statistically non-significant coefficients indicating that the overall discount of indefinite acquired intangibles does not significantly differ between the asset classes. Only for the share of indefinite contract acquired intangibles (e.g. broadcast rights) we find a negative coefficient, which just becomes statistically significant at the 10 percent level. Because the existence of these assets is easy to verify and some contracts and licenses are even traded at semi-liquid markets, their internal valuations can be benchmarked. For intangible assets with a definite lifetime, we, in contrast, see that the coefficient becomes smaller and turns statistically non-significant of the overall amount of definite intangible assets, when using marketing intangibles with definite lifetime as our reference group. Also, for most other intangibles with a definite lifetime, we find no statistically significant markups. Nevertheless, we find positive and statistically significant mark-ups for technology definite intangibles (e.g. patents), which show with their very long lifetime strong similarities with the indefinitely lived intangibles. Additionally, the share of customer related intangibles with definite lifetimes show a small positive coefficient, which is also statistically significant at the 10 percent level in columns (5). Nevertheless, it remains far less expensive compared to goodwill. This result is highly interesting because the FASB discusses subsuming parts of customer intangibles into the goodwill (FASB, 2019) and some comment letter express concerns regarding the auditing of customer intangibles (Clor-Proell et al., 2022). Although the positive and significant coefficient provides evidence consistent with the claims that auditing of customer related intangibles can be challenging and risky compared to physical assets, results show that the markups are still much lower compared to the goodwill.

Electronic copy available at: https://ssrn.com/abstract=4472467

The interaction term with #AccLawsuits remains statistically non-significant for the different subclasses, which points no major differences in the audit risk premium across the different classes. Overall, the results in columns (5) and (6) of Table 2 show that the effects of acquired intangibles on audit fees are heterogeneous regarding different economic lifetimes and classes.

Regarding our control variables, which are only reported in the Online Appendix OA4 to facilitate the readability of Table 2, our regressions show, in general, the expected signs in line with prior literature (Hribar et al., 2014; Zhang, 2018). We find that larger firms with more spare cash on the balance sheet, more foreign sales, more business segments and more leverage have higher fees. Furthermore, firms that issue new capital (IPO/SEO) and that currently engage in a merger pay more fees. In contrast, firms with higher sales growth, higher profitability, no reporting loss but also no extreme smoothing incentives, lower book-to-market ratio, and more inventory and receivables pay lower audit fees. For the auditor and the audit-relation variables, we find lower audit fees when the non-audit fees are larger, higher audit fees when using the Big-4 auditors, and when audit-firm industry leaders and firms have a fiscal year-end in the busy season. Furthermore, audits with a qualified opinion and firms with material weaknesses are more expensive that indicates a risk premium for riskier clients. Overall, only two out of 28 control variables show unexpected effects. We find negative regression coefficients for the share on inventory and receivable which is partially similar to the findings in Reid et al. (2019). These differences might be explained by the use of an extensive vector of control variables compared to Hribar et al. (2014). Our core result on the intangible assets remains unchanged if we do not control for this variable.

4.3 Difference-in-differences: CAM disclosure and the link between audit fees and acquired intangibles

Although we provide strong evidence on the link between acquired intangibles and audit fees that is moderated by the audit risk auditors might face, some concerns remain about the endogeneity

Electronic copy available at: https://ssrn.com/abstract=4472467

of our results. Because our measure of an audit risk is also determined by the firm's fundamentals, it is hard to clearly exclude confounding firm characteristics.

To address this concern, we rely on the first-time public disclosures of CAMs in 2019 and 2020 as a quasi-natural experiment. In 2019 and 2020, the PCAOB allowed auditors for the first time to publicly disclose client's accounting areas that they perceive as subjective, difficult, and complex to audit. Furthermore, the auditor discloses how it addressed the specific matter in the audit, which deters auditor-related lawsuits by highlighting that the auditor performed the required audit tasks. To validate the argument, we start by descriptively exploring the content and length of CAMs conditional on their topic of our firms' CAMs from Audit Analytics (12,446 CAM observations). See Appendix B for one example of an audit report with an intangible CAM and the description of how the auditor addressed the matter.

Table 3 therefore shows the frequency of CAMs on intangibles, goodwill, (initial) business combinations, tangible assets, as well as tax-related matters. Because business combination CAMs refer to the initial recognition of the business combination, whereas all other CAMs refer to the (carrying) amounts of the respective topic, business combinations provide a meaningful benchmark for comparing the initial and the subsequent audit challenges of takeovers. Tangible CAM provide a meaningful benchmark for the audit challenges and the auditors' description characteristics of how they addressed the audit challenges in the CAM subject. Additionally, we report CAM characteristics for tax-related CAMs, which is a frequent CAM topic, yet it is less closely related to the firm's assets, to provide another more unrelated benchmark.

[insert Table 3 around here]

From Table 3, we see that intangible assets are a matter that is raised by the auditor in a CAM around half as frequent as tangible assets or a bit less than tax-related matters. Goodwill or the initial valuation of business combinations are more than double as often subject to CAMs. The

Electronic copy available at: https://ssrn.com/abstract=4472467

lower frequency is inconsistent with the use of intangible CAMs in a generic way with boilerplate statements but speaks more to the auditor's careful and intentional use of intangible CAMs that is well suited to prevent audit risks with respect to the audit of intangible assets.

Looking into the texts, we find that the auditor highlights the use of valuation experts (internal) and valuation specialists (external) in around 52.015 percent of all intangible CAMs. This is 2.5 times as often compared to the valuation of tangible assets with tangible CAMs (only 19.15 percent) or tax-related CAMs (22.41 percent) and about the same compared to goodwill CAM (52.00 percent) but slightly less in CAMs on the initial business combinations (54.47 percent). The result on the use of valuation experts and specialists not only highlight the auditor's use of additional validation and confirmation of their work by specialists. Results also reveal that the auditors actively communicate the employment in their audit report, potentially to signal their substantial audit work. We also see that, with an average of about 193 words, the description of how the auditor addressed intangible-related matters is longer than the description on most other topics such as taxes (175 words) or tangible assets (164 words), again pointing to the auditor's intentionally signaling their substantial work to the public in the audit report.

Because the introduction of the CAM disclosures to all firms is unrelated to the economic fundamentals of any single firm, we argue that the introduction of CAMs can be used as a form of exogenous variation. Furthermore, the disclosure allows us to use the same firm before 2019 as its own control group in a difference-in-differences approach. We restrict our sample to the period from 2015 through 2020 to make sure that the firms before the first-time, intangible-related CAM disclosure remains a proper control.[14] Furthermore, we rely on firms that do not receive these CAMs to capture confounding time trends.

[14] Our results remain qualitatively the same, if restrict our period to alternative time frames (2016-2020, 2017-2020). Moreover, we do not include the year 2021, because we are interested to investigate the effect of the introduction of CAMs on acquired intangible assets.

Electronic copy available at: https://ssrn.com/abstract=4472467

[insert Figure 2 around here]

Before conducting a difference-in-differences test, we first need to test for the common trend in the association between acquired intangibles and audit fees in the pre-period for the difference-in-differences to work properly (Armstrong et al., 2022; Glaeser and Guay, 2017; Roberts and Whited, 2013). Figure 2 shows that there are no statistically significant differences in the associations between indefinite acquired intangibles and audit fees in any year before the first-time disclosure of CAMs. Only after the CAMs are also publicly disclosed we observe that the association between indefinite acquired intangibles and audit fees differs between those firms that receive an intangible-related CAM and those that receive other types of CAMs. The results from Figure 2 provides support for the common trend assumption.

Table 4 shows the multivariate results of the difference-in-differences analysis of the coefficient of acquired intangible assets on audit fees in which the first difference (*CAM_int*) is whether a firm received an intangible-related CAM either for the year 2019 or 2020. This variable is time-invariant and identifies treated firms. The second difference (*Post*) indicates whether a CAMs are publicly disclosed, i.e. it takes the value of one for the years 2019 and 2020, and zero otherwise.

[insert Table 4 around here]

In column (1) of Table 4, we investigate the relation amongst acquired intangibles. Interestingly, we find that the triple interaction of $Acquired\_Int_{(i,t)} \times CAM\_int_{(i)} \times Post_{(t)}$ shows a negative and statistically significant effect. This coefficient means that for the firms that receive an intangible-related CAM, the premium for acquired intangibles in the audit fee becomes lower by 0.345. Furthermore, we see that the base effect of $Acquired\_Int_{(i,t)}$ is positive for all firms irrespective of whether they receive an intangible-related CAM or not. Furthermore, all other main effects and their double interactions remain statistically non-significant at conventional levels.

Electronic copy available at: https://ssrn.com/abstract=4472467

Because the double interactions, such as $Acquired\_Int_{(i,t)} \times CAM\_int_{(i)}$, capture the static difference between the treatment and the control group in this difference-in-differences test (Armstrong et al., 2022), these non-significant coefficients highlight that all static differences between the treatment and the control group are well captured by our control variables.[15] Because the base term of the *Post* indicator does not vary in the cross-section, it is subsumed under the year fixed effects and does not separately show up in the table. The results from column (1) of Table 4 show that with the disclosure of intangible-related CAMs, the audit effects of acquired intangibles and of goodwill diverge even more. Additional tests show that this result holds true even when considering the effects of goodwill-related CAMs. Overall, we learn from column (1) that the association between audit fees and intangibles becomes much weaker compared to that of goodwill once auditors are able to disclose intangible-related CAMs.

In column (2) of Table 4, we see a statistically high, negative triple-interaction effect for the indefinite acquired intangibles while the triple-interaction effect of the definite acquired intangibles is negative, yet statistically non-significant and much smaller in economic size. Furthermore, we see a positive double interaction effect of $Indef\_Int_{(i,t)} \times Post_{(t)}$, which shows that the link between the indefinite acquired intangibles and audit fees becomes larger in the post-period for all firms, but the negative triple interaction tells us that this increase gets overcompensated for by those firms where the auditor can publicly disclose an intangible-related CAM. Additional tests, again, show the differences in the audit effects between acquired intangibles and goodwill following the CAM disclosures. Furthermore, these differences are stronger for the indefinite acquired intangibles but for the definite acquired intangibles, the differences are already there even before the CAM

[15] Triple interactions frequently show non-significant double interactions (e.g., Reid et al. (2019), Table 3) because the treatment effect is captured by the fully interacted model. Only the remaining uncaptured effects, e.g. level differences between the treatment and control group or otherwise unexplained time trends, would show up in these double interactions (Greene (2019)).

Electronic copy available at: https://ssrn.com/abstract=4472467

disclosures. Overall, the results in Table 3 provide empirical support for the evidence that acquired intangibles increase the firm's audit fees primarily through an increase in audit risk. Furthermore, we see that the public disclosure of intangible-related CAMs that arguably reduces the auditor's area-specific audit risk can reduce the premium for acquired intangibles in the audit fees. Thereby, acquired intangibles are related less to audit fees compared to goodwill.

4.4 Robustness tests

In this subsection, we investigate whether our results remain robust with regard to different specifications. First, one might argue that the disclosure of any CAM serves as a protection against potential audit risks, and hence, any CAM disclosure may lead to a decline in audit fees. In this case, our results from Table 4 are not necessarily driven by intangible-related CAMs, but by any type of CAMs. To alleviate this concern, we perform three different placebo tests in Table 5. We start by replicating Table 4 but use the tax-related CAMs instead of only intangible-related CAMs. In addition, we complement our model from Table 4 with the additional interactions with the tax-related CAMs to see whether our core results remain qualitatively unchanged. In a second placebo test in columns (5) through (8), we repeat the analyses but use goodwill-related CAMs as alternative CAM measure. Lastly, we interact the goodwill CAMs not with the amounts of intangible assets but with goodwill and investigate whether our results remain robust after including this additional explanatory interaction.

[insert Table 5 around here]

Table 5 shows that throughout all specifications, the additional placebo tests show weaker and mostly non-significant effects in statistical terms. At the same time, our initial results in columns (3), (4), (7) through (10) remain robust of including those alternative interactions. Only in column (6), we find weak interaction effects with indefinite intangible assets and goodwill CAMs, if we

Electronic copy available at: https://ssrn.com/abstract=4472467

do not control for the effect of intangible CAMs. Nevertheless, the effect disappears once we properly include intangible CAMs and its interactions.

Second, we investigate whether our baseline results in Table 2 are robust with respect to influential observations (Gassen and Veenman, 2021; Leone et al., 2019). Inferences from OLS estimations might change because of the distorting effects of outliers, especially in audit fee regressions (Leone et al., 2019). Therefore, we reestimate columns (1) through (4) of Table 2 with a MM-estimator with a 90 percent Gaussian efficiency level.[16]

[insert Table 6 around here]

The results are reported in Table 6. Again, acquired intangibles are significantly associated with higher audit fees, but their pricing is smaller than that for goodwill. The moderation effect of audit risk becomes slightly weaker but remains statistically significant at conventional levels. A further division of intangibles among economic lifetimes and classes shows large heterogeneities with definite tech and indefinite marketing intangibles being significantly associated with audit fees. All columns remain consistent with the results in Table 2. With regard to the differences between acquired intangibles and goodwill, we find in additional but untabulated analyses that the audit of acquired intangible assets is significantly different from the goodwill position, especially definite intangibles. Overall, the findings indicate that our results are not sensitive to specific outlier effects.

Third, we estimate our baseline results in Table 2 with audit-firm fixed effects in columns (5) through (8) of Table 6. Our previous results might be driven by auditor-specific categories or by the firm's selection of an auditor. Audit-firm fixed effects help mitigate those concerns. The results from columns (5) through (8) of Table 6, again, are in line with the previous results in Table 2.

[16] We do not report for columns (5) and (6) of Table 2 to enhance the readability of the table. We kindly refer to the online appendix to see similar tests also for columns (5) and (6) of Table 2.

Electronic copy available at: https://ssrn.com/abstract=4472467

While goodwill has the largest coefficient due to the audit's complexity, the sizes of the coefficients of acquired intangible assets have not significantly changed. In additional tests, we find that acquired intangible assets, especially definite intangible assets, are significantly less expensive than goodwill regardless of the inclusion of audit-firm fixed effects. Therefore, our prior results are not sensitive to audit firm-specific effects.

Fourth, we estimate our baseline results for non-zero intangible asset firm years only. Our previous sample also contains firm years with zero acquired intangible assets, i.e., firms that have not engaged in an M&A or acquired intangibles in singular transactions. Firms with acquired intangibles assets might be different to audit from firms with no acquired intangibles. Thus, we estimate our audit fee model within a subsample, put differently, a within intangible asset estimator of the effect. The results are reported in columns (9) through (12) of Table 6. The sizes of our significant coefficients are lower than in our previous tests. More importantly, however, our inferences remain the same, in other words, acquired intangible assets are cheaper to audit than goodwill.

An additional concern relates to the impact of critical audit matter dry runs carried out before the introduction (Center for Audit Quality, 2018). In 2018, auditors began to identify client areas where they intended to issue CAMs but did not disclose this information to the public. Even without CAM disclosures in 2018, the dry runs may have affected the auditor-client relationship in terms of audit pricing and in many other dimensions. To mitigate the potential contaminating effects of the CAM dry runs, we exclude 2018 from our analyses in additional tests. The results of the additional tests show that all conclusions from our main tests remain qualitatively unchanged when 2018 is excluded. This gives us additional confidence that the 2018 dry run season is not driving our results.

Electronic copy available at: https://ssrn.com/abstract=4472467

Another concern relates to the possibility for non-accelerated filers to postpone the first disclosure of CAMs until 2020. Only accelerated-filers were required to disclose their CAMs in 2019, but non-accelerated-filers could do so voluntarily. The additional tests show that all conclusions from the tests remain unchanged if all non-accelerated filers are excluded from the sample, although the sample size in these tests becomes smaller.

5. Conclusion

Motivated by the ongoing discussion on the accounting for acquired intangibles and goodwill (Clor-Proell et al., 2022), we investigate their effects for the auditing of firms. Because the amounts of acquired intangibles would be subsumed into goodwill if they were not capitalized separately, the comparison between the coefficients for acquired intangibles and goodwill puts our results in context. We measure the audit effects of acquired intangibles through their pricing in audit fees and the issuance of intangible-related critical audit matters (CAMs).

Using a hand-collected sample of net amounts of acquired intangibles from 2009 to 2021, we find that acquired intangibles are positively associated with audit fees; however, our results support the expectations that they are easier to audit than goodwill. This finding holds true for both definite and indefinite acquired intangibles with definite intangible assets being less expensive than indefinite intangible assets. Nevertheless, we find a large heterogeneity among the different classes of acquired intangibles. Definite tech (patents and developed technology) and indefinite marketing (trademarks and brands) intangibles are significantly associated with audit fees, while many other classes remain insignificant. At the same time, acquired intangibles are frequently associated with receiving an intangible-related CAM, yet –in line with intuition- the probability is higher for indefinite intangible assets than for definite intangible assets. This evidence is consistent with acquired intangible assets are more associated with audit risk. Furthermore, our results regarding the introduction of intangible-related CAMs show that the premium on the acquired intangibles in

Electronic copy available at: https://ssrn.com/abstract=4472467

the audit fees becomes lower after the public disclosure of intangible-related CAMs. First, this result points towards a higher mark up for audit risk by the auditor that might trigger additional procedures. Second, these results are also consistent with increasing the auditor's acceptable audit risk following from CAM disclosures. Because we are unable to follow firms many years after the CAM disclosures because they were disclosed only after 2019, it remains for subsequent studies to investigate whether the link between the acquired intangibles and firms' misstatements also increased after the CAM disclosures, that is, whether there is more audit risk.

Overall, our study answers the recent calls from both academics (Clor-Proell et al., 2022) and standard setters (FASB and IASB) to separately investigate the roles of the amounts of acquired intangibles and their costs as well as the benefits of capitalization from goodwill. Our results shed new light on the potential costs of auditing different acquired intangibles.

Electronic copy available at: https://ssrn.com/abstract=4472467

References

Andrews, C., Falmer, J., Riley, J., Todd, C., Volkan, A., 2009. SFAS 141(R): Global Convergence And Massive Changes In M&A Accounting. JBER 7. https://doi.org/10.19030/jber.v7i4.2282.

Armstrong, C., Kepler, J.D., Samuels, D., Taylor, D., 2022. Causality redux: The evolution of empirical methods in accounting research and the growth of quasi-experiments. Journal of Accounting and Economics 74, 101521. https://doi.org/10.1016/j.jacceco.2022.101521.

Ayres, D.R., Neal, T.L., Reid, L.C., Shipman, J.E., 2019. Auditing Goodwill in the Post-Amortization Era: Challenges for Auditors. Contemp Account Res 36, 82–107. https://doi.org/10.1111/1911-3846.12423.

Badertscher, B., Jorgensen, B., Katz, S., Kinney, W., 2014. Public Equity and Audit Pricing in the United States. J Accounting Res 52, 303–339. https://doi.org/10.1111/1475-679X.12041.

Beatty, A., Weber, J., 2006. Accounting Discretion in Fair Value Estimates: An Examination of SFAS 142 Goodwill Impairments. Journal of Accounting Research 44, 257–288. https://doi.org/10.1111/j.1475-679X.2006.00200.x.

Bell, T.B., Landsman, W.R., Shackelford, D.A., 2001. Auditors' Perceived Business Risk and Audit Fees: Analysis and Evidence. J Accounting Res 39, 35–43. https://doi.org/10.1111/1475-679X.00002.

Beneish, M.D., Harvey, C.R., Tseng, A., Vorst, P., 2022. Unpatented innovation and merger synergies. Rev Account Stud 27, 706–744. https://doi.org/10.1007/s11142-021-09613-9.

Bleibtreu, C., Mohrmann, U., 2019. Do Audit Clients Prefer Watchdogs or Lapdogs? The Effect of Strictness on Audit Offices' Market Shares. SSRN Journal. https://doi.org/10.2139/ssrn.3422803.

Electronic copy available at: https://ssrn.com/abstract=4472467

Brasel, K., Doxey, M.M., Grenier, J.H., Reffett, A., 2016. Risk Disclosure Preceding Negative Outcomes: The Effects of Reporting Critical Audit Matters on Judgments of Auditor Liability. The Accounting Review 91, 1345–1362. https://doi.org/10.2308/accr-51380.

Brown, T., Majors, T.M., Peecher, M.E., 2020. Evidence on how different interventions affect juror assessment of auditor legal culpability and responsibility for damages after auditor failure to detect fraud. Accounting, Organizations and Society 87, 101172. https://doi.org/10.1016/j.aos.2020.101172.

Burke, J., Hoitash, R., Hoitash, U., Xiao, S., 2023. The Disclosure and Consequences of U.S. Critical Audit Matters. The Accounting Review 98, 59–95. https://doi.org/10.2308/TAR-2021-0013.

Cannon, N.H., Bedard, J.C., 2017. Auditing Challenging Fair Value Measurements: Evidence from the Field. The Accounting Review 92, 81–114. https://doi.org/10.2308/accr-51569.

Carcello, J.V., Neal, T.L., 2003. Audit Committee Characteristics and Auditor Dismissals following "New" Going-Concern Reports. The Accounting Review 78, 95–117. https://doi.org/10.2308/accr.2003.78.1.95.

Carcello, J.V., Palmrose, Z.-V., 1994. Auditor Litigation and Modified Reporting on Bankrupt Clients. J Accounting Res 32, 1. https://doi.org/10.2307/2491436.

Center for Audit Quality, 2018. Lessons learned, questions to consider, and an illustrative example., 1–12.

Chen, W., Hribar, P., Melessa, S., 2018. Incorrect Inferences When Using Residuals as Dependent Variables. Journal of Accounting Research 56, 751–796. https://doi.org/10.1111/1475-679X.12195.

Clor-Proell, S.M., Brown, N., Stubben, S.R., White, B.J., Blankespoor, E., Gordon, E.A., Gujarathi, M.R., Henry, E., Merkley, K.J., 2022. Response by the Financial Reporting Policy

Electronic copy available at: https://ssrn.com/abstract=4472467

Committee of the Financial Accounting and Reporting Section of the American Accounting Association to the FASB Invitation to Comment on Identifiable Intangible Assets and Subsequent Accounting for Goodwill. Accounting Horizons 36, 1–19. https://doi.org/10.2308/HORIZONS-2020-194.

Datta, S., Jha, A., Kulchania, M., 2020. On accounting's twenty-first century challenge: evidence on the relation between intangible assets and audit fees. Rev Quant Finan Acc 55, 123–162. https://doi.org/10.1007/s11156-019-00839-y.

deHaan, E., Moon, J., Shipman, J.E., Swanquist, Q.T., Whited, R.L., 2023. Control Variables in Interactive Models. Unpublished paper, Georgia Tech Scheller College of Business Research Paper No. 3959861. https://doi.org/10.2139/ssrn.3959861.

Eaglesham, J., 2023. Auditors Didn't Flag Risks Building Up in Banks: Bond losses such as those at Silicon Valley Bank could have been raised as 'critical audit matters'. Wall 2023.

Ettredge, M.L., Xu, Y., Yi, H.S., 2014. Fair Value Measurements and Audit Fees: Evidence from the Banking Industry. AUDITING: A Journal of Practice & Theory 33, 33–58. https://doi.org/10.2308/ajpt-50701.

Ewens, M., Peters, R., Wang, S., 2019. Measuring Intangible Capital with Market Prices, Cambridge, MA.

FASB, 2019. Identifiable Intangible Assets and Subsequent Accounting for Goodwill. FASB Invitation to Comment: Norwalk, Connecticut.: FASB Invitation to Comment. Norwalk, Connecticut.

Francis, J., Philbrick, D., Schipper, K., 1994. Shareholder Litigation and Corporate Disclosures. Journal of Accounting Research 32, 137. https://doi.org/10.2307/2491279.

Electronic copy available at: https://ssrn.com/abstract=4472467

Francis, J.R., 2011. A Framework for Understanding and Researching Audit Quality. AUDITING: A Journal of Practice & Theory 30, 125–152. https://doi.org/10.2308/ajpt-50006.

Gassen, J., Veenman, D., 2021. Outliers and Robust Inference in Archival Accounting Research. SSRN Journal. https://doi.org/10.2139/ssrn.3880942.

Glaeser, S., Guay, W.R., 2017. Identification and generalizability in accounting research: A discussion of Christensen, Floyd, Liu, and Maffett (2017). Journal of Accounting and Economics 64, 305–312. https://doi.org/10.1016/j.jacceco.2017.08.003.

Glover, S.M., Taylor, M.H., Wu, Y.-J., 2017. Current Practices and Challenges in Auditing Fair Value Measurements and Complex Estimates: Implications for Auditing Standards and the Academy. AUDITING: A Journal of Practice & Theory 36, 63–84. https://doi.org/10.2308/ajpt-51514.

Goncharov, I., Riedl, E.J., Sellhorn, T., 2014. Fair value and audit fees. Rev Account Stud 19, 210–241. https://doi.org/10.1007/s11142-013-9248-5.

Greene, W.H., 2019. Econometric Analysis, Global Edition, 8th ed. Pearson Education Canada, Harlow, 1 Online-Ressource.

Griffith, E.E., 2020. Auditors, Specialists, and Professional Jurisdiction in Audits of Fair Values. Contemp Account Res 37, 245–276. https://doi.org/10.1111/1911-3846.12506.

Gu, F., Lev, B., Zhu, C., 2023. All losses are not alike: Real versus accounting-driven reported losses. Rev Account Stud. https://doi.org/10.1007/s11142-023-09799-0.

Hay, D.C., Knechel, W.R., Wong, N., 2006. Audit Fees: A Meta-analysis of the Effect of Supply and Demand Attributes*. Contemp Account Res 23, 141–191. https://doi.org/10.1506/4XR4-KT5V-E8CN-91GX.

Electronic copy available at: https://ssrn.com/abstract=4472467

Hribar, P., Kravet, T., Wilson, R., 2014. A new measure of accounting quality. Rev Account Stud 19, 506–538. https://doi.org/10.1007/s11142-013-9253-8.

IASB, 2020. Business Combinations—Disclosures, Goodwill and Impairment: IFRS Standards Discussion Paper. London, United Kingdom.

Jha, M., Qian, J., Weber, M., Yang, B., 2023. ChatGPT and Corporate Policies. Chicago Booth Research Paper No. 23-15; Fama-Miller Working Paper, Becker Friedman Institute for Economics Working Paper No. 2023-103. https://doi.org/10.2139/ssrn.4521096.

Kachelmeier, S.J., Rimkus, D., Schmidt, J.J., Valentine, K., 2020. The Forewarning Effect of Critical Audit Matter Disclosures Involving Measurement Uncertainty*. Contemp Account Res 37, 2186–2212. https://doi.org/10.1111/1911-3846.12583.

Kanodia, C., Sapra, H., Venugopalan, R., 2004. Should Intangibles Be Measured: What Are the Economic Trade-Offs? Journal of Accounting Research 42, 89–120. https://doi.org/10.1111/j.1475-679X.2004.00130.x.

Klevak, J., Livnat, J., Pei, D., Suslava, K., 2023. Critical Audit Matters: Possible Market Misinterpretation. AUDITING: A Journal of Practice & Theory 42, 45–70. https://doi.org/10.2308/AJPT-2020-113.

Koonce, L.L., Toynbee, S., White, B.J., 2021. Acquirers' Financial Reporting Preferences and Accounting for Intangibles in Acquisitions. SSRN Journal. https://doi.org/10.2139/ssrn.3465719.

Krishnan, J., 1994. Auditor Switching and Conservatism. The Accounting Review 69, 200–215.

Krishnan, J., Krishnan, J., 1997. Litigation Risk and Auditor Resignations. The Accounting Review 72, 539–560.

Landsman, W.R., Liss, A., Sievers, S., 2021. The Pricing of Acquired Intangibles. TRR 266 Accounting for Transparency Working Paper Series 65. https://doi.org/10.2139/ssrn.3942328.

Electronic copy available at: https://ssrn.com/abstract=4472467

Leone, A.J., Minutti-Meza, M., Wasley, C.E., 2019. Influential Observations and Inference in Accounting Research. The Accounting Review 94, 337–364. https://doi.org/10.2308/accr-52396.

Li, V., Luo, Y., 2023. Costs and benefits of auditors' disclosure of critical audit matters: Initial evidence from the United States. Advances in Accounting 60, 100641. https://doi.org/10.1016/j.adiac.2022.100641.

McInnis, J.M., Monsen, B., 2021. The Operating Returns to Acquired Intangible Assets. SSRN Journal. https://doi.org/10.2139/ssrn.3279123.

Minutti-Meza, M., 2013. Does Auditor Industry Specialization Improve Audit Quality? J Accounting Res 51, 779–817. https://doi.org/10.1111/1475-679X.12017.

Mohrmann, U., Riepe, J., Stefani, U., 2019. Fool's gold or value for money? The link between abnormal audit fees, audit firm type, fair-value disclosures, and market valuation. Int J Audit 23, 181–203. https://doi.org/10.1111/ijau.12155.

Petersen, M.A., 2009. Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches. Rev. Financ. Stud. 22, 435–480. https://doi.org/10.1093/rfs/hhn053.

Reichelt, K.J., Wang, D., 2010. National and Office-Specific Measures of Auditor Industry Expertise and Effects on Audit Quality. J Accounting Res 48, 647–686. https://doi.org/10.1111/j.1475-679X.2009.00363.x.

Reid, L.C., Carcello, J.V., Li, C., Neal, T.L., Francis, J.R., 2019. Impact of Auditor Report Changes on Financial Reporting Quality and Audit Costs: Evidence from the United Kingdom. Contemp Account Res 36, 1501–1539. https://doi.org/10.1111/1911-3846.12486.

Reilly, R.F., Schweihs, R.P., 2014. Guide to intangible asset valuation. American Institute of Certified Public Accountants, New York, NY, Online Ressource.

Electronic copy available at: https://ssrn.com/abstract=4472467

Roberts, M.R., Whited, T.M., 2013. Endogeneity in Empirical Corporate Finance1, in: vol. 2. Elsevier, pp. 493–572.

Seetharaman, A., Gul, F.A., Lynn, S.G., 2002. Litigation risk and audit fees: evidence from UK firms cross-listed on US markets. Journal of Accounting and Economics 33, 91–115. https://doi.org/10.1016/S0165-4101(01)00046-5.

Shalev, R., Zhang, I., Zhang, Y., 2013. CEO Compensation and Fair Value Accounting: Evidence from Purchase Price Allocation. Journal of Accounting Research 51, 819–854. https://doi.org/10.1111/1475-679X.12015.

Simonic, D., Stein, M., 1996. Impact of litigation risk on audit pricing: A review of the economics and the evidence. AUDITING: A Journal of Practice & Theory, 119–134.

Vanstraelen, A., 2003. Going-Concern Opinions, Auditor Switching, and the Self-Fulfilling Prophecy Effect Examined in the Regulatory Context of Belgium. Journal of Accounting, Auditing & Finance 18, 231–254. https://doi.org/10.1177/0148558x0301800204.

Venkataraman, R., Weber, J.P., Willenborg, M., 2008. Litigation Risk, Audit Quality, and Audit Fees: Evidence from Initial Public Offerings. The Accounting Review 83, 1315–1345. https://doi.org/10.2308/accr.2008.83.5.1315.

Vinson, J.M., Robertson, J.C., Cockrell, R.C., 2019. The Effects of Critical Audit Matter Removal and Duration on Jurors' Assessments of Auditor Negligence. AUDITING: A Journal of Practice & Theory 38, 183–202. https://doi.org/10.2308/ajpt-52319.

Zhang, J.H., 2018. Accounting Comparability, Audit Effort, and Audit Outcomes. Contemp Account Res 35, 245–276. https://doi.org/10.1111/1911-3846.12381.

Electronic copy available at: https://ssrn.com/abstract=4472467

Figure 1: Growth of definite and indefinite acquired intangibles in relation to property, plant & equipment

This graph illustrates the growth of definite and indefinite acquired intangibles in relation to property, plant, and equipment (PPE) over time (2010-2018).

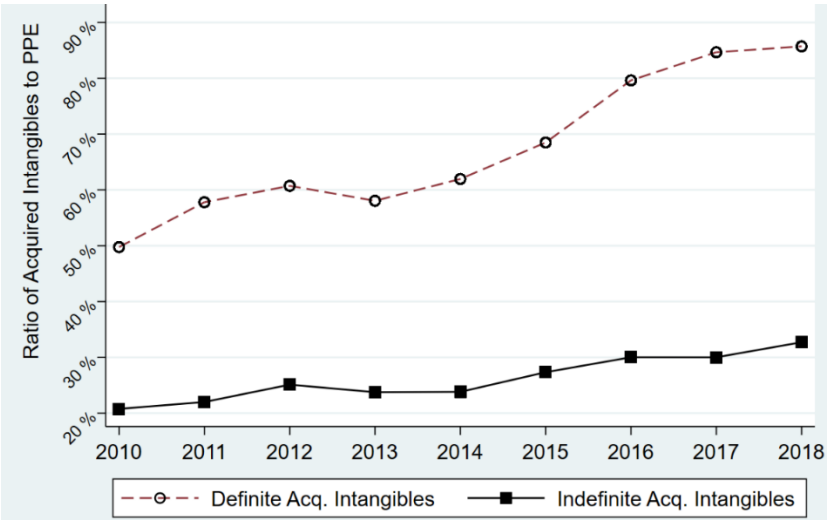
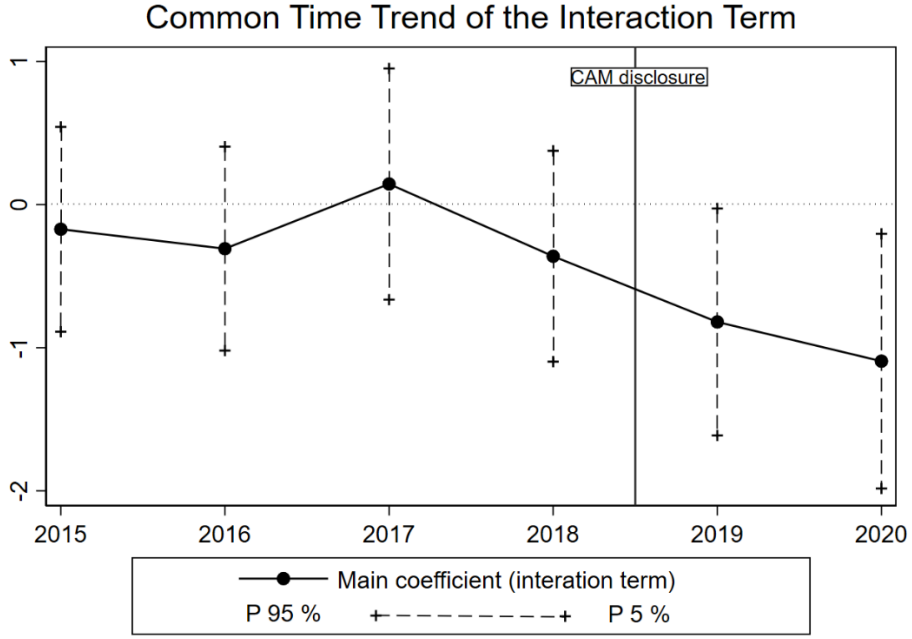


Figure 2: Common trend analysis of audit fees before and after CAM introduction

This graph illustrates the common trend analysis of the coefficient estimate for indefinite acquired intangibles (*CAM_int* × *Indef_Int*). The graph has the plots of the coefficients on the interaction term before (2015-2018) and after (2019-2020) the introduction of CAMs. The upper and lower bars represent confidence intervals on the 5 and 95 percent levels. The confidence intervals are calculated based on clustered standard errors by firm. The dashed line indicates a theoretical coefficient of zero. The period of observation is from 2015 to 2020.



Electronic copy available at: https://ssrn.com/abstract=4472467

Table 1: Descriptive statistics

Panel A: Descriptive statistics on dependent and main independent variables (N = 18,931)

Variables	*Mean*	*SD*	*Median*	*p75*	*p90*	*p95*
Dependent variable:						
Ln (Audit Fee)	14.321	1.181	14.340	15.108	15.801	16.260
Scaled intangibles:						
Acquired_Int	0.0730	0.1029	0.0302	0.1045	0.2077	0.2872
Indef_Int	0.0262	0.0690	0.0000	0.0137	0.0776	0.1646
-Share Marketing Indef	*0.1422*	*0.2638*	*0.0000*	*0.1624*	*0.5674*	*0.8367*
-Share Tech Indef	*0.0097*	*0.0565*	*0.0000*	*0.0000*	*0.0000*	*0.0250*
-Share Contract Indef	*0.0514*	*0.1923*	*0.0000*	*0.0000*	*0.0122*	*0.5379*
Def_Int	0.0454	0.0656	0.0161	0.0652	0.1357	0.1882
-Share Tech Def	*0.0362*	*0.0829*	*0.0000*	*0.0292*	*0.1141*	*0.2006*
-Share Marketing Def	*0.0976*	*0.1670*	*0.0022*	*0.1282*	*0.3333*	*0.4832*
-Share Customer Def	*0.1941*	*0.2178*	*0.1167*	*0.3493*	*0.5148*	*0.6238*
-Share Contract Def	*0.0561*	*0.1534*	*0.0000*	*0.0068*	*0.1882*	*0.4054*
-Share Other Intangibles	*0.0487*	*0.1489*	*0.0000*	*0.0168*	*0.1099*	*0.3000*
Goodwill	0.1358	0.1506	0.0832	0.2264	0.3671	0.4473

Electronic copy available at: https://ssrn.com/abstract=4472467

Panel B: Descriptive statistics on further control variables (N = 18,931)

Control Variables	*Mean*	*SD*	*P25*	*Median*	*p75*	*p90*	*p95*
Size	7.259	2.020	5.942	7.327	8.626	9.835	10.521
ROA	0.007	0.157	-0.007	0.039	0.078	0.129	0.170
CashR	0.183	0.206	0.038	0.107	0.248	0.483	0.654
Sales Growth	0.101	0.369	-0.035	0.051	0.155	0.346	0.560
Special Items	0.019	0.042	0.000	0.005	0.017	0.045	0.086
InvRec	0.235	0.173	0.094	0.204	0.332	0.480	0.584
BTM	0.536	0.474	0.234	0.414	0.675	1.039	1.396
CurrentR	2.561	2.231	1.285	1.929	2.973	4.939	6.903
Foreign	0.034	0.063	0.000	0.006	0.040	0.101	0.158
Leverage	0.423	0.193	0.279	0.421	0.557	0.684	0.758
Loss	0.411	0.492	0	0	1	1	1
Restatement	0.083	0.276	0	0	0	0	1
NAF	0.202	0.236	0.035	0.121	0.282	0.507	0.704
Big_N	0.815	0.388	1	1	1	1	1
Busy Season	0.709	0.454	0	1	1	1	1
Employees	2.801	2.803	0.933	1.957	3.564	6.325	8.585
Smooth	0.232	0.422	0	0	0	1	1
Previous_Lawsuit	0.186	0.389	0	0	0	1	1
Merger	0.362	0.481	0	0	1	1	1
IPO	0.009	0.093	0	0	0	0	0
SEO	0.095	0.293	0	0	0	0	1
Litigation	0.342	0.474	0	0	1	1	1
Audit Opinion	0.227	0.419	0	0	0	1	1
WEAK_404	0.045	0.207	0	0	0	0	0
Tenure	3.572	1.327	2.646	3.464	4.472	5.385	6.083
Business Segment	2.268	0.958	1.732	1.732	3.000	3.606	3.873
Audit Timeliness	4.063	0.204	3.970	4.060	4.174	4.317	4.443
IndLeader_Fee	0.279	0.449	0	0	1	1	1
TV_Industry_Ind	0.010	0.101	0	0	0	0	0

Electronic copy available at: https://ssrn.com/abstract=4472467

Table 2: Acquired intangible assets and audit fees

This table shows the results from OLS regressions examining whether acquired intangibles are associated with audit fees. The dependent variable, *Ln (Audit Fee)*, is the natural log of audit fees. All uneven columns (((1), (3), and (5)) explore the main effects of intangible assets. All even columns ((2), (4), and (6)) explore the moderation effect of audit risk on this association. Columns (1) and (2) explore the effects of acquired intangibles, while columns (3) and (4) explore the acquired intangibles, divided into definite and indefinite acquired intangibles. Columns (5) and (6) show the different associations for different intangible classes, within the acquired intangibles with definite and indefinite lifetimes. The definite and indefinite marketing intangibles serve as the reference group in columns (5) and (6). The acquired intangible variables (*Acquired_Int, Indef_Int, Def_Int)* and *Goodwill* are scaled by total assets, the different intangible classes (*Share Tech Indef, Share Contract Indef, Share Tech Def, Share Customer Def, Share Contract Def, Share Other Intangibles*) are scaled by total acquired intangible asset. Our proxy for audit risk *#AccLawsuits* is the change in the logarithm of one plus the number of accounting-related lawsuits that the firm is exposed to in 12 months after the filing of the annual report. Our coefficient of interest in the even columns is the interaction term. All variables are defined in Appendix A. All models include controls which are not reported for brevity, as well as industry (Fama-French 48) and year fixed effects. We interact all control variables in the even columns with *#AccLawsuits* to control for unobserved heterogeneity effects (deHaan et al., 2023). Standard errors are reported in parentheses below each coefficient estimate, with standard errors clustered by firm. The ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. The period of observation is from 2009 to 2021 (totaling 18,931 observations in the uneven and 15,943 observations in the even columns).

Dependent Var.	*Ln (Audit Fee)*					
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
$Acquired\_Int_{(i,t)}$	0.336***	0.329***				
	(0.096)	(0.102)				
$\#\ AccLawsuits_{(i,t)} \times Acquired\_Int_{(i,t)}$		0.126**				
		(0.052)				
$Indef\_Int_{(i,t)}$			0.420***	0.350**	0.592***	0.524***
			(0.140)	(0.148)	(0.154)	(0.165)
$\#\ AccLawsuits_{(i,t)} \times Indef\_Int_{(i,t)}$				0.152**		0.211**
				(0.066)		(0.107)
$Def\_Int_{(i,t)}$			0.331**	0.390***	0.148	0.232
			(0.137)	(0.146)	(0.155)	(0.165)
$\#\ AccLawsuits_{(i,t)} \times Def\_Int_{(i,t)}$				0.150*		0.118
				(0.088)		(0.106)
$Goodwill_{(i,t)}$	0.611***	0.586***	0.606***	0.575***	0.590***	0.563***
	(0.081)	(0.086)	(0.082)	(0.088)	(0.084)	(0.089)
$\#\ AccLawsuits_{(i,t)} \times Goodwill_{(i,t)}$		-0.020		-0.023		-0.018
		(0.050)		(0.052)		(0.053)

(ctn. on next page)

Electronic copy available at: https://ssrn.com/abstract=4472467

Table 2: Acquired intangible assets and audit fees (ctn.)

Dependent Var.	*Ln (Audit Fee)*					
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Indefinite Classes:						
Share Tech Indef					-0.096	-0.113
					(0.091)	(0.103)
# AccLawsuits$_{(i,t)}$ × *Share Tech Indef*						0.010 (0.066)
Share Contract Indef					-0.099*	-0.107*
					(0.058)	(0.060)
# AccLawsuits$_{(i,t)}$ × *Share Contract Indef*						-0.040 (0.052)
Definite Classes:						
Share Tech Def					0.139**	0.130**
					(0.059)	(0.061)
# AccLawsuits$_{(i,t)}$ × *Share Tech Def*						0.046 (0.045)
Share Customer Def					0.081*	0.055
					(0.048)	(0.051)
# AccLawsuits$_{(i,t)}$ × *Share Customer Def*						-0.022 (0.045)
Share Contract Def					-0.038	-0.035
					(0.063)	(0.065)
# AccLawsuits$_{(i,t)}$ × *Share Contract Def*						0.002 (0.048)
Share Other Intangibles					0.045	0.048
					(0.068)	(0.072)
# AccLawsuits$_{(i,t)}$ × *Share Other Intangibles*						0.007 (0.040)
# AccLawsuits$_{(i,t)}$		0.049		0.063		0.053
		(0.188)		(0.190)		(0.191)
Controls, Industry and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18,931	15,943	18,931	15,943	18,931	15,943

Electronic copy available at: https://ssrn.com/abstract=4472467

Table 3: CAM characteristics

This table shows the frequency of CAMs with different topics, the content and length of the CAM section, in which the auditor describes how they addressed the critical audit matter for the universe of CAMs in our sample (12,446 different CAM observations). Because our sample firms might receive multiple CAMs within one year, the number of CAM observations differs from our number of firm years. This bigger sample yields a comprehensive picture of the population of all CAMs. Because we do not restrict our sample to observations for which we have hand-collected intangible assets and many firms receive multiple CAMs by their auditors, the number of observations of Table 4 differs from those in the other tables. *Intangible CAM* (*Goodwill CAM*, *Business Combination CAM*) refers to critical audit matters on intangibles (goodwill, business combination), as classified by the Audit Analytic 's topic description. Because business combination CAMs refer to the initial recognition of the business combination, whereas all other CAMs refer to the (carrying) amounts of the respective topic, business combinations provide a meaningful benchmark for comparing the initial and the subsequent audit challenges of takeovers. *Tangible CAM* similarly refers to CAMs with respect to the carrying amounts of tangible assets, as classified by the Audit Analytic 's topic description. They provide a meaningful benchmark for the audit challenges and the auditors' description characteristics of how they addressed the audit challenges in the CAM subject. Additionally, we report CAM characteristics for tax-related CAMs, which is a frequent CAM topic, yet it us less closely related to the firm's assets and take-over activities, to provide another more unrelated benchmark. *Use of Valuation Specialists* refers is an indicator variable which takes the value of one if the auditor highlights the use of valuation specialists or valuation experts in its description of how the auditor addressed the matter in the audit, and zero otherwise. Additionally, we report test results on the equality of proportions compared to Intangible CAMs. *Length of How a Matter is Addressed* refers to the number of words, that the auditor uses in its audit report to describe how the CAM-related audit matter was addressed in the audit. Additionally, we report t-test results compared to Intangible CAMs. The ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

		CAM Frequency	**Use of Valuation Specialists**			**Length of How a Matter is Addressed**		
				Difference to (1)			Difference to (1)	
Variable		N	Mean	Prob > |z|	Sig	Mean	Prob > |z|	Sig
(1)	Intangible CAM	521	0.52015			193.13		
(2)	Goodwill CAM	1,425	0.52000	0.51709		200.02	0.1122	
(3)	Business Combination CAM	1,353	0.54472	0.33933		185.67	0.0146	**
(4)	Tangible CAM	1,248	0.19151	0.00000	***	163.87	0.0000	***
(5)	Tax CAM	897	0.22408	0.00000	***	174.68	0.0000	***

Electronic copy available at: https://ssrn.com/abstract=4472467

Table 4: Reduction of audit fees for risky intangibles through CAM disclosure

This table shows the results from examining the reduction in audit fees through CAM disclosure in a difference-in-differences design. *Post* is an indicator variable equal to one for the CAM period (2019-2020), and zero for the pre-period (2015-2018). *CAM_int* is an indicator variable equal to one when the firm receives a CAM for acquired intangibles in 2019 or 2020, and zero otherwise. Our coefficient of interest is the triple-interaction term. The dependent variable, *Ln (Audit Fee)*, is the natural log of audit fees. Column (1) addresses the acquired intangibles, while column (2) addresses the acquired intangibles, divided into definite and indefinite acquired intangibles. Because the groups in the triple interactions become very small, we refrain from reporting the division into lifetimes by classes, which constitutes column (3) in the other tables. The acquired intangible variables (*Acquired_Int*, *Def_Int*, *Indef_Int*) and *Goodwill* are scaled by total assets. All variables are defined in Appendix A. All models include controls, which are not reported for brevity, as well as industry (Fama-French 48) and year fixed effects. The base term of Post gets subsumed under the year fixed effects and is consequently not reported separately. We interact all control variables with *CAM_int* to control for unobserved heterogeneity effects (deHaan et al., 2023). Standard errors are reported in parentheses below each coefficient estimate, with standard errors clustered by firm. The ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Dependent Var.	*Ln (Audit Fee)*	
	(1)	*(2)*
Triple Interactions:		
$Acquired\ Int_{(i,t)} \times CAM\_int_{(i)} \times Post_{(t)}$	-0.345*	
	(0.188)	
$Indef\_Int_{(i,t)} \times CAM\_int_{(i)} \times Post_{(t)}$		-0.794***
		(0.283)
$Def\_Int_{(i,t)} \times CAM\_int_{(i)} \times Post_{(t)}$		-0.026
		(0.305)
Double Interactions:		
$Acquired\ Int_{(i,t)} \times Post_{(t)}$	0.125	
	(0.125)	
$Indef\_Int_{(i,t)} \times Post_{(t)}$		0.534**
		(0.229)
$Def\_Int_{(i,t)} \times Post_{(t)}$		-0.154
		(0.160)
$Acquired\ Int_{(i,t)} \times CAM\_int_{(i)}$	0.063	
	(0.265)	
$Indef\_Int_{(i,t)} \times CAM\_int_{(i)}$		-0.131
		(0.353)
$Def\_Int_{(i,t)} \times CAM\_int_{(i)}$		0.381
		(0.416)
$CAM\_int_{(i)} \times Post_{(t)}$	0.027	0.018
	(0.053)	(0.055)
Main Effects:		
$Acquired\_Int_{(i,t)}$	0.326**	
	(0.141)	
$Indef\_Int_{(i,t)}$		0.429*
		(0.223)
$Def\_Int_{(i,t)}$		0.296
		(0.199)
$CAM\_int_{(i)}$	-1.106*	-1.092*
	(0.628)	(0.635)
$Goodwill_{(i,t)}$	0.538***	0.550***
	(0.101)	(0.103)
Interacted Controls & Industry and Year FEs	Yes	Yes
Observations	8,399	8,399

Electronic copy available at: https://ssrn.com/abstract=4472467

Table 5: Placebo tests on the audit fees effects for risky intangibles through CAM disclosure

This table shows the results from Placebo tests of Table 4 on the audit fee effects of CAM disclosure in a difference-in-differences design. All variables and specification are similar to those in Table 4. In columns (1) and (2) [(3) and (4)], we replace [complement] the triple interaction effect of intangible related CAMs, *CAM_int*, with an indicator variable for tax CAMs of firm i. In columns (5) through (8), we use goodwill-related CAMs as alternative placebo variable and control for the effect of goodwill CAMs on the audit fee effects of goodwill in columns (9) and (10). All variables are defined in Appendix A. All models include the double interactions, main terms, and interacted controls variables (deHaan et al., 2023) similar to Table 4. Standard errors are reported in parentheses below each coefficient estimate, with standard errors clustered by firm. The ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		1st Placebo Test				2nd Placebo Test			3rd Placebo Test	
Triple Interactions:										
Acquired Int$_{(i,t)}$ × CAM_int$_{(i)}$ × Post$_{(t)}$			-0.288				-0.361*		-0.347*	
			(0.188)				(0.201)		(0.193)	
Indef_Int$_{(i,t)}$ × CAM_int$_{(i)}$ × Post$_{(t)}$				-0.688**				-0.754***		-0.760***
				(0.287)				(0.287)		(0.283)
Def_Int$_{(i,t)}$ × CAM_int$_{(i)}$ × Post$_{(t)}$				-0.004				-0.178		-0.085
				(0.304)				(0.310)		(0.310)
Placebo Variable: # CAMs$_{(i)}$										
Acquired Int$_{(i,t)}$ × Tax CAM$_{(i)}$ × Post$_{(t)}$	0.021		-0.073							
	(0.179)		(0.198)							
Indef_Int$_{(i,t)}$ × Tax CAM$_{(i)}$ × Post$_{(t)}$		0.105		-0.157						
		(0.273)		(0.311)						
Def_Int$_{(i,t)}$ × Tax CAM$_{(i)}$ × Post$_{(t)}$		0.059		0.186						
		(0.286)		(0.289)						
Placebo Variable: *Goodwill CAM $_{(i)}$*										
Acquired Int$_{(i,t)}$ × Goodwill CAM $_{(i)}$ × Post$_{(t)}$					-0.057		0.104			
					(0.180)		(0.199)			
Indef_Int$_{(i,t)}$ × Goodwill CAM $_{(i)}$ × Post$_{(t)}$						-0.395*		0.001		
						(0.235)		(0.222)		
Def_Int$_{(i,t)}$ × Goodwill CAM $_{(i)}$ × Post$_{(t)}$						0.360		0.425		
						(0.291)		(0.316)		
Goodwill$_{(i,t)}$ × Goodwill CAM $_{(i)}$ × Post$_{(t)}$									0.216	0.223
									(0.135)	(0.136)
Double Interactions, Main Effects, Interacted Controls, FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,399	8,399	8,399	8,399	8,399	8,399	8,399	8,399	8,399	8,399

Electronic copy available at: https://ssrn.com/abstract=4472467

Table 6: Robustness tests

This table shows the results from various alternative specifications of Table 2, columns (1) through (4) on the association of acquired intangibles and audit fees. Similar results for columns (5) and (6) of Table 2 are reported in the online appendix. Columns (1) through (4) of Table 6 uses robust regression design with a MM-estimator (e.g., Leone et al. (2019), Gassen and Veenman (2021)). In columns (5) through (8), we control for potential audit-firm effects (Audit-firm FE) and in columns (9) through (12), we exclude firms with zero acquired intangible asset. Columns (5) through (12) report results from estimating OLS regressions. The dependent variable, *Ln (Audit Fee)*, is the natural log of audit fees. Each block starts by addressing the acquired intangibles and continues by addressing the acquired intangibles, divided into definite and indefinite acquired intangibles. The acquired intangible variables (*Acquired_Int, Indef_Int, Def_Int*) and *Goodwill* are scaled by total assets. All variables are defined in Appendix A. Columns (1) through (4) include controls (models (5) through (12) interacted controls) which are not reported for brevity, as well as industry (Fama-French 48) and year fixed effects. Standard errors are reported in round parentheses below each coefficient estimate, with standard errors clustered by firm. The ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Dependent Var.	*Ln (Audit Fee)*											
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
$Acquired\_Int_{(i,t)}$	0.339***	0.328***			0.344***	0.343***			0.249**	0.217**		
	(0.096)	(0.103)			(0.093)	(0.100)			(0.099)	(0.106)		
$\#\ AccLawsuits_{(i,t)} \times$		0.075*				0.115**				0.125**		
$Acquired\_Int_{(i,t)}$		(0.039)				(0.052)				(0.059)		
$Indef\_Int_{(i,t)}$			0.421***	0.364**			0.420***	0.355**			0.353**	0.251*
			(0.140)	(0.149)			(0.140)	(0.149)			(0.144)	(0.151)
$\#\ AccLawsuits_{(i,t)} \times$				0.096*				0.149**				0.163**
$Indef\_Int_{(i,t)}$				(0.057)				(0.066)				(0.070)
$Def\_Int_{(i,t)}$			0.336**	0.368**			0.337***	0.400***			0.197	0.243*
			(0.139)	(0.150)			(0.129)	(0.138)			(0.138)	(0.147)
$\#\ AccLawsuits_{(i,t)} \times$				0.072				0.124				0.136
$Def\_Int_{(i,t)}$				(0.069)				(0.088)				(0.097)
$Goodwill_{(i,t)}$	0.576***	0.558***	0.570***	0.549***	0.598***	0.574***	0.594***	0.564***	0.475***	0.442***	0.477***	0.437***
	(0.085)	(0.091)	(0.086)	(0.092)	(0.078)	(0.083)	(0.079)	(0.084)	(0.083)	(0.088)	(0.083)	(0.089)
$\#\ AccLawsuits_{(i,t)} \times$		-0.006		-0.007		-0.014		-0.014		-0.020		-0.020
$Goodwill_{(i,t)}$		(0.037)		(0.039)		(0.050)		(0.051)		(0.053)		(0.055)
Controls,	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18,931	15,943	18,931	15,943	18,930	15,942	18,930	15,942	14,241	11,952	14,241	11,952

Electronic copy available at: https://ssrn.com/abstract=4472467

Appendix A: Definitions of Variables

Variable	Definition	Source
Dependent variables:		
Ln (Audit Fee)	Natural logarithm of audit fees.	Audit Analytics
Intangible asset variables:		
Acquired_Int	Net amount of acquired intangibles scaled by total assets.	Hand-collected database
Indef_Int	Net amount of acquired indefinite acquired intangibles scaled by total assets.	
Share Marketing Indef	Net amount of acquired intangibles related to indefinite marketing scaled by gross intangible assets.	
Share Tech Indef	Net amount of acquired intangibles related to indefinite tech scaled by gross intangible assets.	
Share Contract Indef	Net amount of acquired intangibles related to indefinite contract scaled by gross intangible assets	
Def_Int	Net amount of acquired definite intangibles scaled by total assets.	
Share Tech Def	Net amount of acquired intangibles in definite tech class scaled by gross intangible assets assets.	
Share Marketing Def	Net amount of acquired intangibles in definite non-compete agreements and other marketing classes scaled by gross intangible assets.	
Share Customer Def	Net amount of acquired intangibles in customer class scaled by gross intangible assets.	
Share Contract Def	Net amount of acquired intangible in definite contract classes scaled by gross intangible assets.	
Share Other Intangibles	Net amount of acquired intangibles that are not allocated into one of the four specific categories. For instance, it contains commingled positions as well as artistic intangibles scaled by total assets.	
Control variables from Compustat & Audit Analytics		
Intangible CAM (CAM_int)	Indicator variable equal to one if firm receives a critical audit matter for their acquired intangible positions, and zero otherwise.	
Goodwill CAM	Indicator variable equal to one if firm receives a critical audit matter for their goodwill position, and zero otherwise.	
Tax CAM	Indicator variable equal to one if firm receives a critical audit matter for their tax position, and zero otherwise	
Goodwill	Net amount of goodwill scaled by total assets.	

Electronic copy available at: https://ssrn.com/abstract=4472467

Control variables from Compustat & Audit Analytics (ctn)

Size	Natural logarithm of total sales.
Employees	Square root of the number of employees of the firm.
ROA	Net income scaled by total assets.
CashR	Cash and cash equivalents scaled by assets.
Sales Growth	Change in total sales from prior to current period.
Special Items	Special items scaled by total assets.
InvRec	Inventory and receivables scaled by total assets.
BTM	Book value of equity divided by market value of equity.
CurrentR	Amount of current assets divided by current liabilities.
Foreign	Amount of sales generated in foreign jurisdictions divided by total sales.
Leverage	Sum of short-term debt and long-term debt scaled by total assets.
Loss	Indicator variable equal to one if income before extraordinary items and discontinued operations is negative in the current or two previous years, and zero otherwise.
Smooth	Indicator variable equal to one if firms' income is above the median among those firms with a positive in income, and zero otherwise.
Restatement	Indicator variable equal to one if the firm restated their financial statements, zero otherwise.
Merger	Indicator variable equal to one if firm is engaged in a merger or acquisition, and zero otherwise.
IPO	Indicator variable equal to one in the first year of reporting in Compustat, and zero otherwise.
SEO	Indicator variable equal to one if the firm increased its shares outstanding by at least 10 percent, that is more than only by issuing employee shares, and zero otherwise.
Business Segment	Square root of the number of business segments of the firm.
NAF	Non-audit fees divided by audit fees.
Big_N	Indicator variable equal to one when the firm's auditor is a member of the Big 4, and zero otherwise.
Busy Season	Indicator variable equal to one if firm's fiscal year end is in December, zero otherwise.
Audit Opinion	Indicator variable equal to one if the firm receives a modified audit opinion, and zero otherwise.
Audit Timeliness	Natural logarithm of the number of calendar days from the fiscal year-end to the signature date of the auditor's report.
Tenure	Square root of years that the auditor is with the firm.
Weak_404	Indicator variable that is equal to one if firm received an internal control weakness by the auditor, zero otherwise.
IndLeader_Fee	Indicator variable that is equal to one if auditor is an industry expert within the particular industry, and zero otherwise (see, e.g., Reichelt and Wang (2010)).
Litigation	Indicator variable equal to one for high litigation risk industries, and zero otherwise, as defined in Francis et al. (1994).
Previous_Lawsuit	Indicator variable equal to one if the firm faced an accounting-related lawsuit in the last 12 months, zero otherwise.
# AccLawsuits	The change in the logarithm of the number of accounting-related lawsuits. It is measured by the change in the ongoing lawsuits in 12 months after the annual report had been published.
TV_Industry_Ind	Indicator variable that is equal to one if firm is in the following Standard classification codes: 4841, 4832; and zero otherwise.

Electronic copy available at: https://ssrn.com/abstract=4472467

Appendix B: Example of a critical audit matter (CAM) about acquired intangibles

Example of Walmart Incorporated (2021, page 52):

Valuation of Indefinite-Lived Intangible Assets

Description of the Matter

At January 31, 2021, the Company has $4.9 billion of indefinite-lived intangible assets, which primarily consist of acquired tradenames. As disclosed in Notes 1, 8 and 12 to the Consolidated Financial Statements, these assets are evaluated for impairment at least annually using valuation techniques to estimate fair value. These fair value estimates are sensitive to certain significant assumptions including revenue growth rates, discount rates, and royalty rates.

Auditing management's annual indefinite-lived intangible assets impairment tests was complex and highly judgmental due to the significant measurement uncertainty in determining the fair values of the indefinite-lived intangibles. For example, the fair value estimates are sensitive to significant assumptions identified above that are affected by future market or economic conditions.

How We Addressed the Matter in Our Audit

We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's indefinite-lived intangible asset impairment review process. Our procedures included, among others, testing controls over management's review of the significant assumptions described above used to estimate the fair values of the indefinite-lived intangible assets.

To test the estimated fair values of the indefinite-lived intangible assets, we performed audit procedures that included, among others, assessing methodologies used to determine the fair value, testing the significant assumptions discussed above and testing the completeness and accuracy of the underlying data used by the Company. For example, we evaluated management's forecasted revenue growth rates used in the fair value estimates by comparing those assumptions to the historical results of the Company and current industry, market and economic forecasts. We involved a valuation specialist to assist in evaluating the valuation methodologies and the significant assumptions such as discount rates and royalty rates. Additionally, we performed sensitivity analyses of significant assumptions to evaluate the effect on the fair value estimates of the indefinite-lived intangible assets.

Electronic copy available at: https://ssrn.com/abstract=4472467

Online Appendix OA1: Sample compositions and descriptive statistics

Online Appendix OA1 provides the descriptive statistics for the sample distribution and the dependent and independent variables used in this study. Panel A presents the industry composition of our sample. We define the industries by using the Fama-French 12 industry classifications (excluding the financial industry). Panel B presents the descriptive statistics for the acquired intangible variables. All amounts are denoted in US-$ million. The definitions of the variables can be found in Appendix A.

Panel A: Sample Composition

Industry	*N*	*Firms*	*Percentage*
Nondurables	1,368	182	7.23%
Durables	677	75	3.58%
Manufacturing	2,389	268	12.62%
Energy	974	130	5.15%
Chemical	764	89	4.04%
Equipment	3,761	480	19.87%
Telephone	799	98	4.22%
Utilities	513	54	2.71%
Shops	2,550	328	13.47%
Health	2,502	342	13.22%
Service	2,634	312	13.91%
Sum	18,931	2,358	100%

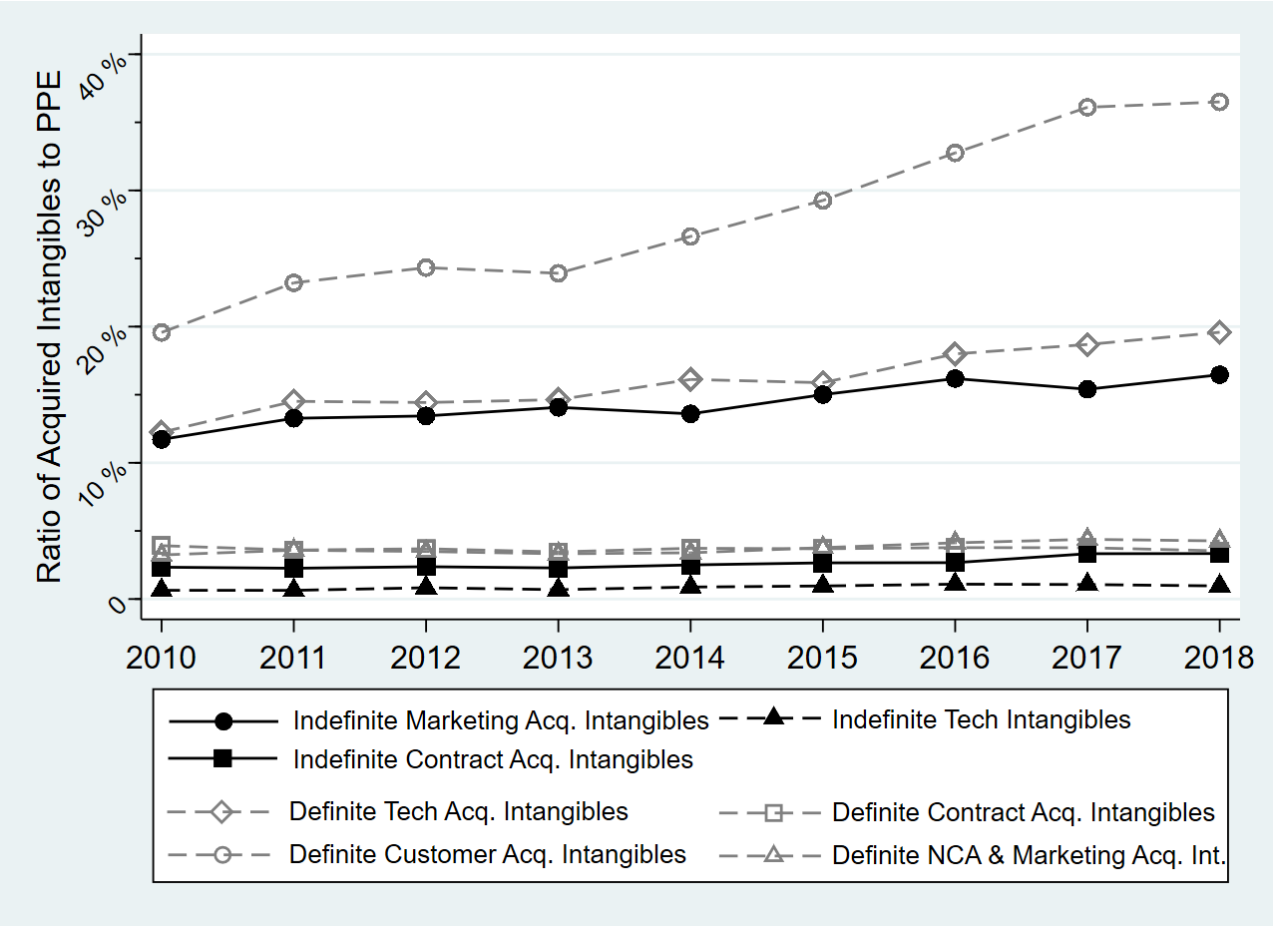
Panel B: Descriptive statistics on acquired intangible assets (in US-$ million)

Variables	*Mean*	*SD*	*Median*	*p75*	*p90*	*p99*
Acquired_Int	626.85	2,200.57	40.78	279.72	1,103.76	17,000.00
Indef_Int	209.06	927.61	0.00	30.12	284.30	7,660.00
Marketing Indef	*99.38*	*407.19*	*0.00*	*7.30*	*155.30*	*3,067.40*
Tech Indef	*6.39*	*40.24*	*0.00*	*0.00*	*0.00*	*347.20*
Contract Indef	*32.16*	*223.38*	*0.00*	*0.00*	*0.00*	*2,053.14*
Def_Int	362.07	1,222.72	21.07	166.05	687.30	9,467.00
Tech Def	*81.46*	*365.75*	*0.00*	*10.86*	*90.08*	*2,906.12*
Marketing Def	*17.32*	*73.07*	*0.00*	*1.90*	*22.20*	*564.10*
Customer Def	*115.72*	*361.50*	*0.88*	*52.95*	*257.00*	*2,591.10*
Contract Def	*22.46*	*103.96*	*0.00*	*0.00*	*17.32*	*802.00*
Goodwill	1,399.40	5,360.09	101.64	743.65	2,910.70	24,521.50

Electronic copy available at: https://ssrn.com/abstract=4472467

Online Appendix OA2: Growth of different Acquired Intangibles in relation to Property, Plant & Equipment

This graph illustrates the growth of different acquired intangible classes divided into definite and indefinite acquired intangibles (indefinite marketing, indefinite tech, indefinite contract, definite tech, definite marketing, definite customer, definite contract) in relation to property & plant, and equipment (PPE) over time (2010-2018).



Electronic copy available at: https://ssrn.com/abstract=4472467

Online Appendix OA3: Example of an acquired intangible asset disclosure

Online Appendix OA3 provides an example of how the break-up of acquired intangible assets is displayed on firms' financial statements. The example comes from the 2017 annual statement of Amazon Incorporated (page 53).

Intangible Assets

Acquired intangible assets, included within "Other assets" on our consolidated balance sheets, consist of the following (in millions):

	December 31,			
	2016			
	Acquired Intangibles, Gross (1)	Accumulated Amortization (1)	Acquired Intangibles, Net	
Marketing-related	$ 499	$ (299)	$ 200	$
Contract-based	397	(212)	185	
Technology- and content-based	705	(353)	352	
Customer-related	299	(182)	117	
Acquired intangibles (2)	$ 1,900	$ (1,046)	$ 854	$

(1) Excludes the original cost and accumulated amortization of fully-amortized intangibles.
(2) Intangible assets have estimated useful lives of between one and twenty-five years.

Electronic copy available at: https://ssrn.com/abstract=4472467

Online Appendix OA4: Main Results with control variables

Online Appendix OA3 provides the regression coefficients and predicted signs from the literature (Hribar et al., 2014; Zhang, 2018) for all control variables of Table 2, columns (1) and (2).

Dependent Var.		*Ln (Audit Fee)*	
	Projected Sign	*(1)*	*(2)*
Main Variables of Interest Full set of Control Variable		See columns (1) and (2) of Table 2	
Size	+ (ZH)	0.394***	0.398***
		(0.012)	(0.012)
# AccLawsuits$_{(I,t)}$ × Size			-0.005
			(0.010)
Employees	+ (HR)	0.068***	0.070***
		(0.008)	(0.008)
# AccLawsuits$_{(I,t)}$ × Employees			0.001
			(0.004)
ROA	- (ZH)	-0.354***	-0.354***
		(0.063)	(0.063)
# AccLawsuits$_{(I,t)}$ × ROA			0.032
			(0.067)
CashR	+ ZH	0.440***	0.450***
		(0.083)	(0.082)
# AccLawsuits$_{(I,t)}$ × CashR			0.007
			(0.056)
Sales Growth	- (ZH)	-0.108***	-0.110***
		(0.014)	(0.015)
# AccLawsuits$_{(I,t)}$ × Sales Growth			-0.010
			(0.023)
Special Items	+ (ZH)	-0.044	-0.012
		(0.117)	(0.117)
# AccLawsuits$_{(I,t)}$ × Special Items			0.303
			(0.190)
InvRec	+ (HR)	-0.422***	-0.427***
		(0.088)	(0.089)
# AccLawsuits$_{(I,t)}$ × InvRec			-0.019
			(0.048)
BTM	-/ ? (HR)	0.011	0.010
		(0.016)	(0.016)
# AccLawsuits$_{(I,t)}$ × BTM			0.003
			(0.019)
CurrentR	- (HR)	0.004	0.004
		(0.006)	(0.006)
# AccLawsuits$_{(I,t)}$ × CurrentR			0.009*
			(0.005)
Foreign	+ (HR)	1.466***	1.480***
		(0.147)	(0.147)
# AccLawsuits$_{(I,t)}$ × Foreign			-0.211**
			(0.099)

Electronic copy available at: https://ssrn.com/abstract=4472467

Online Appendix OA4 (ctn.)

Dependent Var.		*Ln (Audit Fee)*	
	Projected Sign	*(1)*	*(2)*
Leverage		0.130***	0.129***
	+	(0.049)	(0.049)
# AccLawsuits$_{(i,t)}$ × Leverage	(HR; ZH)		0.010
			(0.038)
Loss		0.108***	0.111***
	+	(0.017)	(0.017)
# AccLawsuits$_{(i,t)}$ × Loss	(HR; ZH)		-0.034*
			(0.019)
SMOOTH		-0.106***	-0.107***
	-	(0.016)	(0.016)
# AccLawsuits$_{(i,t)}$ × SMOOTH			-0.009
			(0.018)
Restatement		0.020	0.020
	+	(0.017)	(0.017)
# AccLawsuits$_{(i,t)}$ × Restatement	(ZH)		-0.075**
			(0.035)
Merger		0.106***	0.107***
	+	(0.014)	(0.014)
*# AccLawsuits$_{(i,t)}$ ×*Merger	(HR; ZH)		0.019
			(0.015)
IPO		0.291***	0.289***
	+	(0.051)	(0.053)
# AccLawsuits$_{(i,t)}$ × IPO	(HR; ZH)		-0.070
			(0.132)
SEO		0.118***	0.118***
	+	(0.016)	(0.016)
# AccLawsuits$_{(i,t)}$ × SEO	(HR; ZH)		0.029
			(0.030)
Business Segment		0.051***	0.050***
	+	(0.011)	(0.011)
# AccLawsuits$_{(i,t)}$ × Business Segment	(HR, ZH)		-0.003
			(0.006)
NAF		-0.231***	-0.227***
	-	(0.036)	(0.036)
# AccLawsuits$_{(i,t)}$ × NAF			-0.006
			(0.028)
Big_N		0.530***	0.528***
	+	(0.030)	(0.030)
# AccLawsuits$_{(i,t)}$ × Big_N	(HR)		0.045**
			(0.022)
Busy Season		0.072***	0.071***
	+	(0.022)	(0.023)
# AccLawsuits$_{(i,t)}$ ×Busy Season	(HR; ZH)		0.012
			(0.014)

Electronic copy available at: https://ssrn.com/abstract=4472467

Online Appendix OA4 (ctn.)

Dependent Var.		*Ln (Audit Fee)*	
	Projected Sign	*(1)*	*(2)*
Audit Opinion	+ (HR; ZH)	0.044***	0.044***
		(0.013)	(0.013)
# AccLawsuits$_{(i,t)}$ × Audit Opinion			-0.010
			(0.016)
Audit Timeliness	?	0.053	0.048
		(0.049)	(0.049)
# AccLawsuits$_{(i,t)}$ ×Audit Timeliness			-0.018
			(0.036)
Tenure	+/? (HR)	0.004	0.004
		(0.008)	(0.008)
# AccLawsuits$_{(i,t)}$ × Tenure			-0.001
			(0.006)
Weak_404	+	0.247***	0.252***
		(0.029)	(0.029)
# AccLawsuits$_{(i,t)}$ × Weak_404			-0.035
			(0.039)
IndLeader_Fee	+ (HR)	0.079***	0.080***
		(0.018)	(0.018)
# AccLawsuits$_{(i,t)}$ × IndLeader_Fee			0.004
			(0.013)
TV_Industry_Ind	-	-0.418***	-0.407***
		(0.088)	(0.086)
# AccLawsuits$_{(i,t)}$ × TV_Industry_Ind			-0.048*
			(0.029)
Previous_Lawsuit	+ (HR)	0.080***	
		(0.021)	
Litigation		-0.039	
		(0.046)	
# AccLawsuits$_{(I,t)}$			0.049
			(0.188)
Industry and Year FE		Yes	Yes
Observations		18,931	15,943

HR: from Hribar et al. (2014), ZH: from Zhang (2018)

Electronic copy available at: https://ssrn.com/abstract=4472467

Online Appendix OA5: Types of acquired intangible assets

Online Appendix OA5 provides an explanation of the different lifetimes and classes of acquired intangible assets. Both the FASB and the IASB specify five different classes of intangibles in their frameworks: *tech*, *customer*, *contract*, *marketing*, and *artistic*.[17] *Tech* acquired intangibles mainly cover patents, in-process R&D, developed technologies, and software but also trade secrets, such as formulas and recipes. Auditors can easily verify the existence of patents and software as they are contractible, but their valuations can be challenging. The patents also lack a proper external benchmark for valuation because, by their nature, they are not traded on a liquid market and are often very specific. Furthermore, the valuation of patents requires both highly sophisticated technical knowledge as well as a good understanding of the firm's business model to quantify their economic benefits. Consequently, tech acquired intangibles require valuation experts that could increase the costs of an audit. Furthermore, valuations of patents and other tech intangibles involve a high level of managerial discretion.

Customer acquired intangibles cover customer lists and relationships but also order backlog. Most customer acquired intangibles closely relate to the firm's business activities, which makes it hard to disentangle their values from the overall goodwill. Furthermore, their valuation involves a large degree of subjectivity. Consequently, auditors can face higher risk regarding those assets. Nevertheless, there are well-established procedures to estimate a client's value that auditors can compare to other firms. Consequently, customer acquired intangibles might show a better auditability compared to goodwill.

[17] Artistic acquired intangibles, such as performance events, literary works, musical works, and pictures as well as television programs are the rarest class of intangibles. They are clustered in very few firms in the entertainment industry and their valuation requires greater industry expertise. Because artistic acquired intangibles are very rare in our dataset, we do not separately investigate them but subsume them into other intangibles.

Electronic copy available at: https://ssrn.com/abstract=4472467

Contract acquired intangibles cover all sorts of tradable contracts, such as licensing agreements, service contracts, lease agreements, franchise agreements, broadcast rights, or employment contracts as well as use rights, such as drilling rights or water rights. Some of these rights show definite lifetimes because the contracts expire, while other contracts such as FCC licenses can have indefinite lifetimes. Similar to patents, the existence of a contract acquired intangibles is easily verifiable. Some of these intangibles, such as broadcasting rights and lease agreements, also possess market benchmarks for their valuations; while others, such as franchise agreements, are closely tied to the valuation of goodwill. Consequently, contract acquired intangibles require less effort by the auditor and also possess lower levels of audit risk than goodwill.

Marketing acquired intangibles cover non-compete agreements, newspaper mastheads, and internet domain names as well as trademarks and tradenames. These acquired intangibles are characterized by a very close link to the firm's business activities and are, consequently, hard to differentiate from goodwill. Because most of them have an indefinite lifetime, these assets also require an annual impairment test by the auditor. Consequently, marketing acquired intangibles behave similarly to a firm's goodwill. Nevertheless, some of them possess valuation benchmarks from similar transactions and can even be pledged as collateral in a loan contract. Thereby, a bank can also provide assurance of reliability to some marketing acquired intangibles that reduces the underlying audit effort.

To illustrate the importance of each acquired intangible class, *Figure App. B.1* highlights the distribution of the different classes of acquired intangibles over time in relation to the amount of property, plant, and equipment (PPE). It shows that the acquired intangible classes develop differently over time. While all classes show a similar magnitude in the beginning of our sample period, *Figure App. B.* shows a fast increase in marketing acquired intangibles at the beginning,

Electronic copy available at: https://ssrn.com/abstract=4472467

which becomes flatter towards the end of our sample period. Since 2006, there has been a substantial increase in customer acquired intangibles that further accelerates towards the end of our sample period. Thereby, those acquired intangibles are the largest group, which is consistent with recent evidence that it has become the most prominent intangible asset in an acquisition (Beneish et al., 2022). Tech acquired intangibles show a smooth and steady increase in their economic magnitude and become the second most important group during the years 2016 through 2018. In contrast to the other three acquired intangible classes, contract acquired intangibles show hardly any increase during our sample period. Nevertheless, when compared to the firm's PPE, which we use for scaling in *Figures 1* of the manuscript and *Figure App. B.*, we find that each of the different classes appear economically relevant to the firm.

Overall, the different classes of acquired intangibles show very different degrees of verifiability of and discretion in valuations. Most classes are fairly easy to verify, but their valuations partially require the expertise of specialists in terms of industry or technological knowledge. Furthermore, some of the acquired intangible classes are closely tied to the firm's business model and are, consequently, difficult to differentiate from goodwill.

Electronic copy available at: https://ssrn.com/abstract=4472467

Online Appendix OA6: Types of acquired intangible assets

This table shows the results from various alternative specifications of Table 2, columns (5) through (6) on the association of acquired intangibles and audit fees. It uses robust regression design with a MM-estimator in columns (1) and (2), audit-firm effects in columns (3) and (4), and we excludes firms with zero acquired intangible asset in columns (5) and (6). Columns (3) through (6) report results from estimating OLS regressions. The dependent variable, Ln (Audit Fee), is the natural log of audit fees. The acquired intangible variables and *Goodwill* are scaled by total assets, the shares of the different intangible classes (*Indef_Tech*, *Indef_Contract*, *Def_Tech*, *Def_Customer*, *Def_Contract*, *Other*) by total acquired intangible assets. Our proxy for audit risk *#AccLawsuits* is the change in the logarithm of one plus the number of accounting-related lawsuits that the firm is exposed to in 12 months after the filing of the annual report. Our coefficient of interest in the even columns is the interaction term. All variables are defined in Appendix A. Columns (1) through (4) include controls (models (5) through (12) interacted controls) which are not reported for brevity, as well as industry (Fama-French 48) and year fixed effects. Standard errors are reported in round parentheses below each coefficient estimate, with standard errors clustered by firm. The ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Electronic copy available at: https://ssrn.com/abstract=4472467

Dependent Var.	*Ln (Audit Fee)*					
	Robust Regressions		*With Auditor FEs*		*Exclude Only Goodwill Firms*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Indef_Int$_{(i,t)}$	0.603***	0.553***	0.508***	0.503***	0.373**	0.265
	(0.152)	(0.163)	(0.164)	(0.164)	(0.155)	(0.164)
# AccLawsuits$_{(i,t)}$ ×		0.089		0.222**		0.185*
Indef_Int$_{(i,t)}$		(0.110)		(0.106)		(0.112)
Def_Int$_{(i,t)}$	0.199	0.255	0.212	0.248	0.217	0.288*
	(0.158)	(0.171)	(0.156)	(0.157)	(0.153)	(0.163)
# AccLawsuits$_{(i,t)}$ ×		0.017		0.093		0.120
Def_Int$_{(i,t)}$		(0.110)		(0.107)		(0.107)
Goodwill$_{(i,t)}$	0.551***	0.520***	0.568***	0.561***	0.438***	0.395***
# AccLawsuits$_{(i,t)}$ ×	(0.087)	(0.093)	(0.085)	(0.085)	(0.086)	(0.092)
Goodwill$_{(i,t)}$		-0.013		-0.011		-0.023
		(0.059)		(0.052)		(0.058)
Indefinite Classes:						
Share Tech Indef	-0.163*	-0.163*	-0.081	-0.068	0.103	0.073
	(0.084)	(0.097)	(0.102)	(0.102)	(0.109)	(0.120)
# AccLawsuits$_{(i,t)}$ ×		-0.007		0.004		0.014
Share Tech Indef		(0.052)		(0.068)		(0.074)
Share Contract Indef	-0.123**	-0.138**	-0.089	-0.097	-0.156***	-0.173***
	(0.062)	(0.064)	(0.060)	(0.059)	(0.060)	(0.062)
# AccLawsuits$_{(i,t)}$ ×		0.011		-0.052		-0.039
Share Contract Indef		(0.053)		(0.052)		(0.053)
Definite Classes:						
Share Tech Def	0.147**	0.146**	0.133**	0.145**	0.093	0.062
	(0.058)	(0.061)	(0.060)	(0.060)	(0.063)	(0.066)
# AccLawsuits$_{(i,t)}$ ×		0.068		0.046		0.028
Share Tech Def		(0.048)		(0.044)		(0.051)
Share Customer Def	0.040	0.025	0.051	0.036	-0.063	-0.096*
	(0.047)	(0.050)	(0.049)	(0.049)	(0.051)	(0.054)
# AccLawsuits$_{(i,t)}$ ×		-0.015		-0.026		-0.037
Share Customer Def		(0.042)		(0.044)		(0.047)
Share Contract Def	-0.066	-0.059	-0.012	-0.017	-0.155**	-0.162**
	(0.068)	(0.071)	(0.063)	(0.063)	(0.072)	(0.076)
# AccLawsuits$_{(i,t)}$ ×		0.026		-0.007		-0.015
Share Contract Def		(0.057)		(0.048)		(0.054)
Share Other Intangibles	0.080	0.089	0.054	0.053	-0.077	-0.087
	(0.063)	(0.066)	(0.071)	(0.072)	(0.071)	(0.075)
# AccLawsuits$_{(i,t)}$ ×		0.028		0.004		0.001
Share Other Intangibles		(0.035)		(0.041)		(0.043)
# AccLawsuits$_{(i,t)}$		0.134		0.103		0.116
		(0.187)		(0.190)		(0.193)
Controls, Industry and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Auditor FEs			Yes	Yes		
Observations	18,931	15,943	15,942	15,942	14,241	11,952

Electronic copy available at: https://ssrn.com/abstract=4472467

Online Appendix OA7: Examples of Intangible-related Lawsuits

Online Appendix OA7 provides three distinct examples of accounting related lawsuits that center around the measurement of intangible assets.

1. Mordy v. KLX Inc et al (Case start date: 2016-01-06; Case end date: 2017-02-07)

According to the complaint, KLX allegedly materially misrepresented the value of KLX's assets. More specifically, KLX allegedly misrepresented the value of the identifiable intangible assets and goodwill associated with its Energy Services Group, as well as its policies and methodology related to the calculation of risk, goodwill, and asset impairment.

2. Margolis v. Fly Leasing Limited et al (Case start date: 2016-03-25; Case end date: 2016-10-07)

On March 25, 2016, Gerald Margolis filed a putative class action lawsuit in the United States District Court for the Southern District of New York, asserting that Fly Leasing Limited, Colm Barrington (our Chief Executive Officer), and Gary Dales (our Chief Financial Officer) violated Sections 10(b) and 20(a) of the Securities Exchange Act of 1934 and Rule 10b-5 promulgated thereunder by making materially false and misleading statements regarding the Company's business, operational and compliance policies, particularly concerning our accounting with respect to intangible assets and liabilities for aircraft acquired with in-place leases. The complaint seeks an unspecified amount of monetary damages on behalf of the putative class and an award of attorney's fees, expert fees and other costs. The case was voluntarily dismissed on October 7, 2016.

3. Oregon Laborers Employers Pension Trust Fund et al v. Maxar Technologies Inc et al (Case start date: 2019-01-14)

Plaintiffs allege that defendants violated Sections 10(b) and 20(a) of the Securities Exchange Act of 1934 (the Exchange Act) and Rule 10b-5 promulgated thereunder. According to the complaint, throughout the Class Period, Defendants made materially false and misleading statements regarding the Company’s business, operational and compliance policies. Specifically, Defendants made false and/or misleading statements and/or failed to disclose that: (i) Maxar improperly inflated the value of its intangible assets, among other accounting improprieties; (ii) Maxar’s highly-valued WorldView-4 was equipped with CMGs that were faulty and/or ill-suited for their designed and intended purpose; and (iii) as a result, Maxar’s public statements were materially false and misleading at all relevant times.

Electronic copy available at: https://ssrn.com/abstract=4472467

Online Appendix OA8: Acquired intangibles and their related critical audit matter (CAM)

This table shows descriptive statistics from our subsample analysis investigating, which firms receive intangible-related critical audit matters (CAM). Panel A reports descriptive statistics of our dependent and independent variables from our sample. Panel B presents the industry composition of our restricted sample, the issuance of CAMs, intangible-related CAMs, and goodwill-related CAMs. The period of observation is from 2019 until 2021 (totaling 3,578 observations).

Panel A: Descriptive statistics of subsample (N = 3,578 firm years)

Variables	*Mean*	*SD*	*P25*	*Median*	*p75*	*p90*	*p95*
Intangible CAM	0.094	0.291	0	0	0	0	1
Goodwill CAM	0.194	0.395	0	0	0	1	1
Size	6.876	2.393	5.722	7.231	8.423	9.491	10.026
Age	3.108	0.720	2.708	3.258	3.611	4.007	4.060
Business Segment	1.898	0.815	1.414	1.732	2.449	3.162	3.464
BTM	0.437	0.594	0.145	0.331	0.625	1.016	1.428
Leverage	0.517	0.277	0.330	0.493	0.657	0.842	1.002
Merger	0.409	0.492	0	0	1	1	1
SEO	0.134	0.340	0	0	0	1	1
Smooth	0.435	0.496	0	0	1	1	1
Previous Lawsuit	0.094	0.292	0	0	0	0	1
Loss	0.503	0.500	0	1	1	1	1
Restatement	0.057	0.232	0	0	0	0	1
Big N	0.766	0.423	1	1	1	1	1
Tenure	3.765	1.389	2.646	3.873	4.690	5.568	6.325
Audit Timeliness	4.056	0.238	3.932	4.043	4.159	4.344	4.489
Weak_404	0.056	0.231	0	0	0	0	1
Litigation	0.367	0.482	0	0	1	1	1
A Filer	0.898	0.302	1	1	1	1	1

Panel B: Descriptive evidence of CAMs, intangible-related CAMs, and goodwill-related CAMs

Industries	*N*	*Received any CAM*	*Received an Intangible CAM*	*Received a Goodwill CAM*
Nondurables	274	197	69	60
Durables	129	96	10	33
Manufacturing	455	380	50	158
Energy	121	97	6	10
Chemical	152	130	23	54
Equipment	697	536	35	97
Telephone	140	109	33	39
Utilities	59	53	4	4
Shops	509	351	40	97
Health	565	412	41	49
Service	477	398	24	92
Sum	3,578	2,759	335	693

Electronic copy available at: https://ssrn.com/abstract=4472467

Panel C: Acquired intangibles and the probability of receiving a critical audit matter (CAM)

This table shows the results of examining whether acquired intangibles are associated with receiving a critical audit matter (CAM) about acquired intangibles and goodwill. It shows results of our logit estimation of equation (2). The dependent variable, *Intangible CAM*, is an indicator variable equal to one when receiving a CAM about acquired intangibles, and zero otherwise. Column (1) addresses acquired intangibles, while column (2) addresses acquired intangibles, divided into definite and indefinite acquired intangibles. Column (3) shows the different associations for different intangible classes, divided into definite and indefinite lifetimes. Column (4) addresses whether acquired intangible assets are associated with receiving a goodwill CAM (*Goodwill CAM*). Acquired intangible variables (*Acquired_Int, Indef_Int, Indef_Marketing, Indef_Tech, Indef_Contract, Def_Int, Def_Tech, Def_NCA & Marketing, Def_Customer, Def_Contract, Other*) and *Goodwill* are scaled by total assets. All variables are defined in Appendix A. All models include controls, which are not reported for brevity, as well as industry (Fama-French 12) and year fixed effects. Standard errors are reported in parentheses below each coefficient estimate, with standard errors clustered by industry (Fama-French 12). *Economic* indicates the marginal effects at the mean (Greene [2019], Bushman et al. [2010]). The ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. The period of observation is from 2019 until 2021 (totaling 3,578 observations).

Dependent Var.	*Intangible CAM*						*Goodwill CAM*	
	(1)		*(2)*		*(3)*		*(4)*	
	Coefficient	*Economic*	*Coefficient*	*Economic*	*Coefficient*	*Economic*	*Coefficient*	*Economic*
Acquired_Int	7.839***	0.371					1.233	0.130
	(0.647)						(0.975)	
Indef_Int			11.153***	0.522				
			(0.800)					
Indef_Marketing					15.545***	0.687		
					(2.129)			
Indef_Tech					27.344***	1.209		
					(4.827)			
Indef_Contract					16.125***	0.713		
					(3.133)			

Electronic copy available at: https://ssrn.com/abstract=4472467

Panel C: Acquired intangible assets and probability of receiving a critical audit matter (CAM) (ctn.)

Def_Int			4.861***	0.227				
			(0.968)					
Def_Tech					9.334***	0.413		
					(1.734)			
Def_NCA & Marketing					1.785	0.079		
					(8.677)			
Def_Customer					2.001	0.088		
					(1.724)			
Def_Contract					3.963	0.175		
					(6.029)			
Other					12.524	0.554		
					(8.248)			
Goodwill	-0.035	-0.002	0.185	0.009	-0.013	-0.007	4.197***	0.442
	(0.552)		(0.570)		(0.504)		(0.764)	
Goodwill CAM	1.407***	0.067	1.492***	0.070	1.565***	0.079		
	(0.150)		(0.154)		(0.259)			
Intangible CAM							1.347***	0.141
							(0.275)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,578		3,578		3,578		3,578	
Pseudo R^2	0.245		0.263		0.286		0.238	
Area under the ROC curve	0.845		0.857		0.867		0.829	

Electronic copy available at: https://ssrn.com/abstract=4472467

Online Appendix OA9: Example of a Lawsuits which refers to the lack of relevant critical audit matter (CAM)

This appendix provides an example of a lawsuits against an audit firm, KPMG, for, among other things, the lack of issuing a relevant critical audit matter. Thereby, the relevant passage from point 109 is highlighted in bold and italic letters by the auditors and is given a frame to be identified more easily. Source: https://storage.courtlistener.com/recap/gov.uscourts.cand.410878/gov.uscourts.cand.410878.1.0.pdf
This example is also mentioned by Eaglesham (2023) to illustrate the link between CAMs and litigation risk.

(…)

109. The 2022 Annual Report included an audit report signed by the Company's auditor, KPMG, reflecting the results of its audit of SVB's 2021 and 2022 financials. KPMG certified that "the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2021 and 2022, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2022, in conformity with U.S. generally accepted accounting principles."

Even though SVB's deposits began to decline in 2022, falling $25 billion during the final nine months of 2022 and reducing SVB's liquidity, KPMG did not identify risks associated with SVB's declining deposits or SVB's ability to hold debt securities to maturity in its report.

Additionally, KPMG's audit report was silent as to whether—pursuant to Public Company Accounting Oversight Board AS 2415—there was "substantial doubt about [SVB's] ability to continue as a going concern for a reasonable period of time."

Electronic copy available at: https://ssrn.com/abstract=4472467