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Tax certified individual auditors and effective tax rates

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Abstract This study examines how the appointment of tax certified individual auditors is associated with reported effective tax rates of corporate clients. The study uses a unique German institutional setting which makes it possible to track individual auditors that are also certified tax consultants and sign the audit opinion. Empirical results indicate that tax certified individual engagement partners are associated with higher effective tax rates. Further tests reveal that this association also exists for individual parent company financial statements and that it is stronger when tax confirmation services are provided to the audit client. My findings enhance the understanding of the role of individual auditors.

Keywords Tax certified individual auditor · Effective tax rate · Knowledge spillover

JEL Classification M41 · M42 · H26

1 Introduction

This paper examines the association between individual auditors who are also certified tax consultants and corporate effective tax rates. A rising number of international companies, among them Google, Apple, Starbucks, or Amazon, to mention the most high-profile cases, have pursued aggressive tax avoidance strategies and in turn, minimized their tax burdens. Lately, also European companies like BASF (Germany), Fiat (Italy), and Engie (France) have been accused to aggressively avoid taxes. This corporate behavior has drawn public

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attention to the taxation of multinational corporations and in turn has triggered both an academic and political debate on the subject of corporate tax avoidance (see OECD 2013).

An emerging stream of research suggests that specialized audit firms influence their clients' extent of corporate tax avoidance. For example, studies like Richardson et al. (2013) and McGuire et al. (2012) focus primarily on the impact of audit firms or local audit offices and find an association with tax avoidance.

Another avenue of research, however, has found that individuals' characteristics matter to financial statement outcomes too, in terms of both audit quality (e.g., Cahan and Sun 2015; Gul et al. 2013; Knechel et al. 2015) and tax avoidance (e.g., Dyreng et al. 2008). Nevertheless, still 'we know very little about the people who conduct audits' (Francis 2011, p. 134) and 'tax papers tend to ignore the role of the financial statement auditor' (Maydew and Shackelford 2007, p. 312). And despite quality control mechanisms within audit firms and their local branches it is ever more important to understand the association that individuals have with the audit outcome (Gul et al. 2013), even if associations might be hard to be elucidated. This study aims to fill this gap by assessing the connection of individual auditors who are also tax consultants with reported corporate effective tax rates.

Knowledge is a substantial factor for auditors to provide expert performance (Bonner and Lewis 1990) and with the help of broader knowledge experts can perform more efficiently (Bédard and Chi 1993). However, auditors' performance differs depending on the source of their knowledge and their expertise (Libby and Luft 1993). Tax-specific knowledge is a subspecialty within the general domain of auditing knowledge (Bonner and Lewis 1990), but it differs from auditing expertise by the skills and processes learned (Bonner et al. 1992). Moreover, there are, admittedly, two different auditor types—those who are tax certified and those who are not—but it is unclear *how* these two types differ concerning tax-specific knowledge. It can only implicitly be assumed due to a lack of evidence that the additional qualification of auditors to be a chartered tax consultant is accompanied by more 'tax specific knowledge' that is in any way relevant for corporate effective tax rates. But, it is also unclear *ex ante* what the association is between the knowledge of certified tax consultants and reported corporate effective tax rates during the audit engagement. Auditors' tax certification may, on the one hand, enable them to reduce their clients' tax burden by making them aware of advantageous features of the tax code allowed in conjunction with their financial reporting expertise (Maydew and Shackelford 2007). On the other hand, certified tax consultants may be more aware of reporting behavior that could trigger an inspection by the tax authorities, leading to a lower level of aggressive tax reporting (Kittl 2015; Klepper et al. 1991; Klepper and Nagin 1989). In addition to the ambiguity of the expected association of auditors' qualification to be a chartered tax consultant and effective tax rates, there is also the uncertainty of reverse causality. In that sense, clients could consciously select their individual auditor depending on their characteristics or tax strategy. Also individual auditors might have unobservable motivations to become chartered tax consultants and to be hired by specific audit firms. This issue forbids drawing any causal inferences. Therefore, it is beyond my intent to proxy for any other superior auditor characteristic than being just tax

certified. I only aim to report and explore interesting correlations between a specific auditor characteristic and effective tax rate measures. Causal explorations of these associations are left for future research.

I investigate the research question using a German institutional setting, because it offers several advantages. First, using German data enables me to identify the individual auditors, both review and engagement partners,¹ who sign the audit opinion.² Second, the German institutional setting requires professional tax consultants to pass an official taxation exam before they receive a license. Passing this exam entitles them to become chartered tax consultants (*‘Steuerberater’*, or StB). Chartered tax consultants can in general provide professional tax advisory services. Third, the data compiled by the German Chamber of Public Accountants (*‘Wirtschaftsprüferkammer’*, or WPK) contain information on whether auditors have the status of tax consultant. This research setting is hence suitable to examine the association between individual auditors who are also tax certified and corporate effective tax rates while engaged in providing audit services to the client.

In Germany, becoming a certified auditor (comparable to a CPA) requires passing an exam on four topics: auditing, business administration, commercial law, and taxation. The state examination for auditors enables auditors, once qualified, to advise non-listed corporate clients on various issues including taxation. However, it is common practice for auditors to also take a state examination specifically for taxation so they can be fully certified chartered tax consultants. This particular exam goes beyond tax issues dealt with in the state examination for auditors and is very challenging. The failure rate regularly lies at around 50%. This exam can be seen as a further education of auditors that broadens individual auditors' knowledge and allows to differentiate among auditors. Consequently, since this tax certification expands the knowledge acquired with the audit examination, audit exam candidates who have already passed the state examination for chartered tax consultants are permitted to bypass the exam on taxation. However, candidates for the state examination for chartered tax consultants who are already certified auditors may only bypass the accounting portion of the state examination for tax consultants.

I construct a sample of German listed companies from non-financial industries from 2008 to 2014. Data were hand-collected from the companies' consolidated annual financial statements including individual auditors' names, dates of signature, and fees paid. I matched the names of the individual engagement partners with data compiled by the German Chamber of Public Accountants (WPK) to obtain information whether they are tax certified. Finally, I add company data from

¹ The terms ‘individual auditor’ and ‘engagement partner’ are used interchangeably in this study. However, individual auditors, referred to as ‘engagement partners’ in this study, do not necessarily have audit partner status within the audit firm. In Germany, as soon as auditors are certified they are authorized to sign audit opinions even while they are still in a managerial role.

² It is common practice in Germany for two auditors to sign the audit opinion. The signature on the left is that of the review partner, who merely confirms the correctness of the audit. The engagement partner places his or her signature on the right-hand side and is, by contrast, normally directly involved in conducting the audit. Although it is perfectly clear that in practice, the audit is not just performed by the engagement partner who signs the audit opinion, it can be assumed that the engagement partner is the only involved party who assesses or contributes to the level of corporate effective tax rates. The following analyses hence only concentrate on engagement partners.

Bisnode and Thomson Reuters Financials to examine the relationship between tax certified individual auditors and various corporate effective tax rate measures while controlling for firm-specific factors and auditor characteristics.

My findings suggest that tax certified individual engagement partners are positively associated with the current effective tax rate and cash effective tax rate which regard effects of shifting current tax expenses and tax payables to later accounting periods. Even though *StB* shows no correlation with tax rates in the descriptives and no association with the effective tax rate *ETR* in the analyses, the empirical results suggest that having an individual auditor that is also a certified tax consultant is associated with a higher current effective tax rate by about 4.8% points and a higher cash effective tax rate by about 5.5% points. These results are in contrast with prior studies that find tax consultants reduce tax payers' tax burden (see Blaufus et al. 2014; Kittl 2015; McGuire et al. 2012) but suggest that interactions with effective tax rates differ as soon as the tax consultants under investigation are auditors.

I conduct several additional tests to examine the robustness of my results also because *StB* shows no association with *ETR*. I conduct analyses to control for companies' complexity, their selection for (non) tax certified individual auditors, and the selection of individual auditors to become tax consultants or not. I also run a time-series based change analysis for tax certified individual auditor changes when the engaged audit firm remains to be the same. Further, I integrate additional variables that may moderate the effects of tax certification with knowledge spillover effects (e.g., tax confirmation services, and local tax authorities' enforcement strength). In that regard, further tests reveal that the association of tax certified individual auditors is complemented by the provision of tax confirmation services leading to higher levels of reported effective tax rates. This finding is in line with prior evidence and confirms that audit teams benefit from client-specific knowledge of tax teams (Christensen et al. 2015; Kinney et al. 2004). In other analyses, I run tests on individual auditor involvement by limiting the sample depending on company size and individual financial statements according to German GAAP of the parent companies. The results given by moderations with company size show more pronounced associations between tax certified individual auditors and cash effective tax rates the bigger corporate clients are. When individual parent company financial statements according to German GAAP are regarded the association with tax certified individual auditors is found to be even stronger.

My study contributes to the literature in four ways. First, it adds to the research on the variation in firms' effective tax rates. Prior studies have examined a wide variety of factors that influence corporations' level of 'tax avoidance' and offered a better understanding of the 'undersheltering puzzle' (e.g., Dyreng et al. 2010; Gallempore et al. 2014; McGuire et al. 2012), which describes the phenomenon that despite the benefits of saving taxes, not a great deal of corporate tax sheltering takes place (Hanlon and Heitzman 2010; Weisbach 2002). I extend this line of research by considering an additional party, individual auditors, in relation to reported effective tax rates consistent the notion from Scholes et al. (2015). The existing literature only addresses the link between external local audit

firms, individual executives, or corporate governance structures and different corporate tax avoidance measures (e.g., Dyreng et al. 2010; McGuire et al. 2012; Richardson et al. 2013). Second, this study extends prior research by examining the relevance of individual auditor certification. Recent literature examines the influence of individual auditor characteristics on audit quality and audit fees (e.g., Cahan and Sun 2015; Ernstberger et al. 2015; Gul et al. 2013; Knechel et al. 2015). This paper adds to this line of research by discussing whether individual auditors' qualification to be a chartered tax consultant is related to corporate effective tax rates. Third, I add to prior audit-tax knowledge spillover literature (see, e.g., Christensen et al. 2015; Gleason and Mills 2011; Kinney et al. 2004) by investigating knowledge spillover effects on the individual auditor level. My study demonstrates that providing tax confirmation services is directly related to the association of individual auditors that are also tax consultants with corporate effective tax rates. Finally, my study expands literature on the influence of tax consultants on tax payers' tax burden. So far, prior research examines the effect of pure tax advisors on individual tax payers' non-business income (e.g., Blaufus et al. 2014; Kittl 2015). I extend this stream of research by investigating whether auditors who are primarily operating as auditors but hold the professional qualification of a tax consultant are associated with publicly disclosed corporate tax burdens.

The next section describes relevant prior literature, the German institutional background, and develops the research question. The third section presents the underlying research design. Empirical results can be found in the fourth section. The final section contains a summary and conclusion.

2 Literature review, institutional background, and research question

2.1 Prior literature

Some studies already address the link between auditor expertise and corporate tax rates, but have only a look at the audit firm or local audit office level rather than examining the association at the individual auditor level. Examining the influence of good corporate governance structures on tax avoidance, Richardson et al. (2013) provide evidence that companies that use one of the Big 4 auditing firms display significantly less aggressive tax planning. By contrast, both Crabbé (2010) and Janssen et al. (2005) find that the use of a Big 4 auditor in Belgium results in higher levels of tax avoidance.

Prior research already provides evidence that the general audit expertise available at local audit office level improves audit quality (i.e., Balsam et al. 2003; Choi et al. 2010; Reichelt and Wang 2010). McGuire et al. (2012) examine how the tax-specific industry expertise of the local audit office as well as its audit-specific expertise, influences the level of tax avoidance. Their results show that in cases where the company being audited receives tax services from a tax expert, there is a greater degree of tax avoidance. By contrast, neither Bauer et al. (2012) nor Ochoa

and Jimenez-Angueira (2012) find obvious evidence of a link between industry specialization and tax avoidance.

However, these studies do not provide any evidence on the association between individual auditor and effective tax rates. This lack of evidence might be one reason why the variation in tax rates remains largely unexplained. Because individual auditors are personally responsible for their own and the audit team's actions associated with the auditing brief (ISA 220.18; ISQC 1.30), their effect on effective tax rates reported in the financial statements should not be underestimated (Reichelt and Wang 2010). Also, individual auditors are personally responsible for their actions associated with the auditing brief. Accordingly, Goodwin and Wu (2014) provide evidence that specialization is an individual auditor effect rather than a local audit office level phenomenon.

Consistently, there is also evidence that individual auditors affect audit quality, audit fees, and the capital market, which highlights their special importance for audits. For example, Gul et al. (2013) observe a positive relationship between individual auditor characteristics and audit quality for the Chinese market. Ittonen et al. (2015) report that partners with a greater number of public-sector clients, as a proxy for specialization, provide higher quality audits. Using German data, Ernstberger et al. (2015) reveal that the engagement partner's technical knowledge enhances audit quality. Knechel et al. (2015) demonstrate that aggressive or conservative reporting by Swedish firms is a systematic audit partner attribute, which the market also recognizes. Aobdia et al. (2015) find a positive association between individual audit partners' quality and market responses. Nevertheless, there is still no evidence concerning the link between individual auditors that are also tax certified and the clients' effective tax rates. This study intends to fill this gap.

2.2 Background information to the German institutional setting

Like their international counterparts, German companies' efforts to bring down effective tax rates have risen since listed enterprises in Europe were obliged to prepare their consolidated financial statements in accordance with International Financial Reporting Standards (IFRS). German companies now instead of just minimizing the net present value of their firm's tax expenses (Fischer et al. 2005; Schneeloch 1990), they also compete to achieve low corporate tax rates (Lühn 2007; Mammen 2010; Sureth et al. 2009; Walz et al. 2013; Zielke 2009). It can be assumed that IFRS group account statements are those reports optimized by listed corporations from a tax accounting perspective, since group financial statements represent the primary information source for investors. Therefore, it is justified to use consolidated accounts to evaluate the overall level of effective tax rates of a business entity, even if it is true that taxes are assessed on the individual firm level in Germany.

In their effort to cut taxes, German companies could consciously attempt to engage not just specific audit firms and local audit office experts or buy tax planning services from their incumbent auditor (Lassila et al. 2010; McGuire et al. 2012; Richardson et al. 2013). Companies could also consciously appoint (non) tax certified individual auditors to optimize their taxes. However, by now it is neither

known if companies can select their individual auditors per se nor which kind of selection they are willing to make depending on their situation (McGuire et al. 2012).

Section 319a (1) no. 2 sentence 1 of the German Commercial Code (*‘Handelsgesetzbuch’*, or HGB) prohibits auditors of companies traded on the capital market from offering tax advisory services at the same time to ensure auditor independence. This rule applies in cases where these tax advisory services go beyond simply pointing out alternative arrangements and if they have a not insignificant and direct impact on the annual accounts. Accordingly, all fees disclosed in the annual statements in accordance with Section 314 (1) no. 9 of the HGB applies to tax services designed to confirm tax arrangements that the client or the client’s tax preparer has already made. In other words, German auditors of listed enterprises are only allowed to provide tax *confirmation* services, not tax *planning* services. Thus, these tax *confirmation* services are more closely related to audit services than non-audit services (Taeger and Müller 2013), meaning that impaired auditor independence in fact is not an issue and auditors focus on the audit procedure. Moreover, because the tax department of the incumbent audit firm renders the tax confirmation services, individual auditors of listed enterprises are only commissioned to conduct the actual audit. This setting allows to investigate the pure association of individual auditors that are also certified tax consultants with effective tax rates during the *audit* engagement when no tax *planning* services are provided.

It is common practice in Germany that two auditors sign the audit opinion. The engagement partner whose signature is on the right is the auditor who actually does the fieldwork and is directly involved in the audit in question. The auditor who signs on the left mainly performs review work (Gul et al. 2013). Therefore, it can be assumed that the engagement partner is the only auditor who can directly observe the client’s level of reported effective tax rates. As a consequence, engagement partners are the only individual auditors regarded in the following.³

2.3 Research question development

Concerning corporate reporting, auditors can be expected to have a powerful position. Their cognitive base determined by their formal education serves them to perceive situations about what is going on and what should be done about these situations (Hambrick and Mason 1984). A respective education for tax issues give auditors by assumption also the ability to know extreme tax planning arrangements and in turn, to make a decision on that in their position as auditors. Also for pure auditing services as well as for audit quality tax knowledge is particularly relevant. For example, tax knowledge is useful when evaluating tax accruals, tax expense, tax liabilities, and tax reserves (see Gleason and Mills 2011; Janssen 2015) or when assessing the fiscal consequences and risks associated with a particular strategy

³ In supplemental analyses (not displayed) I also conduct the regressions with the review partner’s tax certification. The number of observations is then reduced to 1379 because some review partners cannot be identified. All in all, no significant association with review partners that are also certified tax consultants is found, indicating that review partners are not related to the clients’ level of effective tax rates.

(McGuire et al. 2012). In this context, primarily declarative tax knowledge, which is obtained by passing exams, in contrast to procedural knowledge, which is acquired through practice, has been shown to improve the ability to identify tax issues (Bonner et al. 1992). Different career paths of individual auditors going hand in hand with less procedural knowledge in tax preparation in comparison to pure tax consultants is therefore not expected to matter for the auditors' ability to assess tax issues. Therefore, it seems suitable to regard declarative tax knowledge in the following.⁴

Even an audit engagement will give an individual auditor potential occasion to point the client towards alternative tax arrangements or assess tax items that are relevant to the financial accounts. A single auditor is not able and not supposed to set up complicated structures in order to cut taxes: first, it is prohibited by Section 319a (1) no. 2 sentence 1 of the German Commercial Code; second, specially trained tax departments will be responsible for tax designs. But knowledge that is related to the financial accounts can also have an impact on the net present value of reported tax expenses in the short or long term. These are capabilities that auditors, above all, have (Maydew and Shackelford 2007), so that even auditors who are engaged to provide audit services but are tax certified may be expected to produce a minimized reported tax burden. This attempt to provide additional benefits seems reasonable because auditors face fierce competition within the audit.

However, since auditors are responsible for a clean financial statement, it is not unlikely that their decisions about corporate tax burdens will contrast with pure tax consultants' advice even when auditors have the formal tax consultant qualification. Auditors with tax certification could, therefore, require adjustments that limit the associated financial statement benefits of low effective tax rates (McGuire et al. 2012). This reduction is especially important if the audit firm was not involved in designing the tax plan in question (see Cook and Omer 2013; Donohoe and Knechel 2014; Maydew and Shackelford 2007). Fears with regard to possible reputational damage⁵ induced by media in case of detected clients' tax sheltering could result in a tax certified individual auditor determining low reported effective tax rates and refusing to approve previously set tax arrangements by the client. Because Germany is a low litigation risk country, settling audit failures with compensation is reduced. This legal environment creates a setting where auditor reputation is even more important (Weber et al. 2008). Consequently, the German audit market provides an opportunity to test the reputational incentive of individual auditors that are also chartered tax consultants. Given by assumption that auditors with tax certification

⁴ I am aware that auditors per se are also taught in tax issues in their education to become a CPA. However, it is the scope of this study to investigate the association of individual auditors' *additional* qualification to be a chartered tax consultant and effective tax rates.

⁵ With regard to companies, cf. on this subject the results of Graham et al. (2014), which can—in their broadest sense—also be applied to auditors. The survey of Graham et al. (2014) showed that 70% of managers in charge of tax affairs regarded their company's reputation in connection with its tax avoidance strategy to be important or very important. 58% considered the risk of attracting negative attention from the media as important or very important (Graham et al. 2014). Analytical studies on the consequences of reputational damage caused by tax avoidance, however, show mixed results. This suggests that the significance attached to the problem by actors within the company may not necessarily correspond to the way in which it is perceived, or valued, by external actors (Lietz 2013).

may be more familiar with the tax code than auditors that are no tax consultants, tax certified individual auditors may be, in this context, better able to judge the risk of aggressive reporting being detected by tax authorities. Individual auditors that are also tax consultants may, therefore, restrict the clients' level of reported effective tax rates to maximize clients' after-tax income given the risk taking and potential penalties upon detection (Kittl 2015; Klepper et al. 1991; Klepper and Nagin 1989).

In order to find out more about the role of auditors that are also certified tax consultants for corporate effective tax rates, I formulate the following research question:

RQ: Are individual engagement partners that are also certified tax consultants associated with the reported level of corporate effective tax rates?

3 Research design

3.1 Sample and data

This study includes all German non-financial enterprises that were listed on the German CDAX as of December 30th 2014, whose parent was domiciled in Germany and that draw up group accounts in accordance with IFRS. The accounting data for the corresponding enterprises were taken from the Bisnode⁶ and Thomson Reuters Financials databases for the period 2008 to 2014.⁷ To compile some of the lagged variables, data from 2007 were also used. In addition, data were hand-collected from the company reports of the enterprises under review, including information on the fees paid to the auditor appointed to undertake the final audit under Section 314 (1) no. 9 of the HGB, together with the names of the auditors signing the audit opinion and the date of the opinion. Similarly, the amount of taxes paid on profits was taken from the company reports in cases where no information on this was found in the Thomson Reuters Financials database. Characteristics pertaining to the auditor carrying out the final audit, such as possession of a tax consultant status and the date of appointment, were drawn from a set of data compiled in February 2014 by the German Chamber of Public Accountants (WPK) and were matched to the auditors signing the company accounts.⁸

⁶ Bisnode (formerly Hoppenstedt) is an information service provider that has offered accounting data on German companies since 1987.

⁷ Prior years are not in scope since Germany's 2008 Corporate Tax Reform led to substantial changes in tax rates and the application of tax legislation. The observation period begins in 2008 to ensure a comparable tax environment throughout.

⁸ In most cases auditors sign their audit opinion only with their last name, so a clear match is sometimes problematic. In such cases the match is performed by combining the information given until the uncertainty is resolved (otherwise these observations are dropped). These combinations are: name, location plus audit firm; (first name) last name; PhD title plus name, if available; name plus corresponding audit firm. Moreover, a manual review is done of different spellings of the auditor's name in the audit reports and the WPK register as well as of any mergers between audit firms, which result in auditors being employed by a different audit firm effective February 2014 than on the date of the audit opinion. Where auditors objected to their data being displayed in the set of data compiled by the WPK, the necessary criteria were hand-collected from the WPK's public online register.

Consistent with prior research, banks, insurance companies, holding companies, leasing and property companies, and financial service firms, all classified in the two-digit Global Industry Classification Standard (GICS) Group 40, were excluded from the sample because they are subject to accounting rules that differ and have differences in their balance sheet structures. Because some data were missing, the provisional sample for assessing industry expertise by local audit office is reduced to 2177 observations. In cases where information for the dependent variables in subsequent regression analyses is not available, the observations are excluded as well. Companies with short fiscal years are also not included. Considering observations that lack engagement partners' names in the audit opinions, and ambiguous matches between auditor expertise and name, and missing data to calculate control variables, the number of observations remaining in the unbalanced data sample is 1482 for 300 companies (see Table 1 for the sample selection process and the Appendix for variable definitions).

3.2 Multivariate model

The regression model is consistent with those in Chen et al. (2010), Frank et al. (2009), and McGuire et al. (2012) with firm and year fixed effects (subscripts are omitted). These fixed effects are included because the level of effective tax rates may vary among firms and observed periods. Standard errors are clustered on the firm level according to Petersen (2009).

$$\begin{aligned}
 \text{Rate} = & \beta_0 + \beta_1 \text{StB} + \beta_2 \text{R\&D} + \beta_3 \text{Size} + \beta_4 \text{Lev} + \beta_5 \text{PPE} + \beta_6 \text{Cash} + \beta_7 \text{ROA} \\
 & + \beta_8 \text{NOLCF} + \beta_9 \text{Intang} + \beta_{10} \text{Acc} + \beta_{11} \text{Export} + \beta_{12} \text{Inv} + \beta_{13} \text{Big4} \\
 & + \beta_{14} \text{OverallExpert} + \beta_{15} \text{TaxExpert} + \beta_{16} \text{Experience} + \beta_{17} \text{Taxfee} \\
 & + \beta_i \sum \text{Firm} + \beta_t \sum \text{Year} + \varepsilon
 \end{aligned}
 \tag{1}$$

The appendix provides variable definitions. The variable *Rate* represents one of three effective tax rate measures *ETR*, *CurrETR*, and *CashETR*.⁹

In this context, *ETR* represents the relationship between overall tax expense, including deferred taxes, and pre-tax earnings of the year. Thus, by taking into account provisions for deferred taxes that were simultaneously set aside, this rate disregards any effects that shift current tax expenses or tax payables to later accounting periods. In contrast to this, *CurrETR* depicts only the current tax expenses excluding deferred taxes, and *CashETR* indicates the relative size of cash taxes paid (Hanlon and Heitzman 2010). As in most cases of international double taxation the German tax system imposes the exemption method by following the worldwide approach to taxing foreign income, Germany-based multinationals can easily use the benefits of lower foreign tax rates (Spengel 2005). Consequently, profit shifting should not lead to excessively high deferred tax liabilities which could potentially bias tax rate measures.

⁹ It should be noted in this respect that *ETR*, *CurrETR*, and *CashETR* measure a greater degree of 'tax avoidance' when their values are small.

Table 1 Sample selection

	Companies	Observations
Potential sample size if panel data for CDAX companies from 2008 to 2014 were balanced	449	3143
Less: banks, insurance companies, holding companies, leasing and property companies, and financial service firms	(68)	(476)
Less: firm-year observations with no IFRS consolidated financial statements available in Bisnode	(42)	(455)
Less: not available annual reports or missing reported audit fees		(35)
Equals: sample of unbalanced firm-year observations used to estimate <i>OverallExpert</i> and <i>TaxExpert</i>	339	2177
Less: firm-year observations with zero or negative pre-tax income for calculating effective tax rates (<i>ETR</i> , <i>CurrETR</i> , <i>CashETR</i>)	(20)	(525)
Less: short fiscal years		(8)
Less: missing engagement partners in audit opinions	(7)	(44)
Less: no data availability of engagement partners' tax certification and auditing experience	(3)	(93)
Less: missing firm-year observations for year $t-1$	(2)	(9)
Less: firm-year observations with missing property, plant and equipment for calculating <i>CapitalIntensity</i> and negative <i>Lev</i>	(7)	(16)
Equals: sample of firm-year observations used to estimate Eq. (1)	300	1482

OverallExpert indicator variable equal to 1 if the audit firm is an overall expert in a given industry and city, *TaxExpert* indicator variable equal to 1 if the audit firm is a tax expert in a given industry and city, *ETR* effective tax rate, *CurrETR* current effective tax rate, *CashETR* cash effective tax rate, *CapitalIntensity* sales divided by net property, plant and equipment, *Lev* leverage

The regression equation represents the effect of tax certification at the individual auditor level. The corresponding variable for tax certification at the level of the individual auditor is *StB*, which takes the value 1 if the auditor approving the accounts is a chartered tax consultant. The practical aspects of the audit are not just performed by the engagement partner who signs the audit opinion. However, engagement partners lead the audit team and take the most important decisions, thus it is appropriate to control for their effect on the audit outcome (Gul et al. 2013).

In addition to this, I use control variables that previous research has provided evidence of a connection to effective tax rates. Tax breaks are monitored using the amount of capital expenditure on research and development, *R&D*, as well as leverage *Lev*, which indicates the corresponding funding structure (Gupta and Newberry 1997; Lietz 2013). The variable fixed assets (*PPE*) helps to monitor capital intensity, while providing me—together with the variables intangibles *Intang* and inventories *Inv*—with benchmarks to capture the valuation differences under IFRS and tax laws (Chen et al. 2010). The variables *Size* and *Export* are used to monitor certain scale and complexity effects. Profitability effects are covered by return on assets *ROA* and net operating loss carryforward *NOLCF*. In that sense, *NOLCF* can only be derived from group financial statement information and is proxied by an indicator variable. The variable *Cash* is used to capture possible needs to lower the effective tax burden that may be triggered if the company's working

capital declines too strongly (McGuire et al. 2012). Total accruals *Acc* are also integrated with a view to capturing the tax reporting aggressiveness that comes along with the company's earnings management (see Frank et al. 2009) but also earnings management that may be reflected in effective tax rates. Since upward managed earnings can be the denominator of effective tax rates, effective tax rates may be reduced if this effect is induced by earnings management.

Big4 is also integrated as some studies, e.g., Richardson et al. (2013), have found an association with the level of corporate tax aggressiveness and the engaged audit firm. Following McGuire et al. (2012) the variables *OverallExpert* and *TaxExpert* are included as control variables for industry-specific knowledge on branch office level. The respective audit branch office is deemed to have overall (tax) expertise if it generates at least 30% (see Neal and Riley 2004) of all of its annual fees (annual tax fees) by working for the observed firms from within the same town¹⁰ and same industry, according to the two-digit GICS code. To control for the audit experience of the individual engagement partner, the variable *Experience* is also included in the regression model. *Experience* is measured on the basis of the natural logarithm of the number of years of professional experience that the auditor has gained since being appointed a certified public accountant to the date of signing the books, since audit quality may be influenced by the professional experience of the auditor (Cahan and Sun 2015; Ittonen et al. 2015). Concerning the variable *TaxExpert*, results will probably differ from those obtained by McGuire et al. (2012), because publicly disclosed tax fees paid to the local audit firm refer only to tax *confirmation* services (*Taxfee*). This means that every firm in the sample prepares its income tax statement on its own or has another tax preparer than the incumbent audit firm. Therefore, it is unnecessary to model a first-stage model to control for the probability of purchasing auditor-provided tax services, as is done by McGuire et al. (2012). Nevertheless, *TaxExpert* and *Taxfee* are included in the regression model for completeness' sake because the incumbent audit firm may not provide any tax *planning* services.

4 Results

4.1 Descriptive statistics

Table 2 provides descriptive statistics for model variables. In this context, it is noteworthy that *ETR* has a mean of 29%, which is lower than the nominal overall burden of 31.2% but still relatively high (BDI and VCI 2013; see Langkau and Rubart 2013, for comparably high levels of effective tax rates of German enterprises). By contrast, average current effective tax rates (*CurrETR*) are at 30.5%. By comparison, the mean of cash effective tax rates (*CashETR*) is lower at 28.6%.

¹⁰ Only those German cities were considered, in which at least three of the Big 4 accounting firms (Deloitte, EY, KPMG, PwC) have a branch, with the office maintained in Eschborn by EY being attributed to Frankfurt and that maintained in Leonberg by BDO being attributed to Stuttgart, as the distance between the respective cities is a scant 15 km.

Table 2 Descriptive statistics

	No. of observations	Mean	SD	Min	<i>p</i> 25	Median	<i>p</i> 75	Max
<i>ETR</i>	1482	0.290	0.180	0	0.213	0.289	0.338	1
<i>CurrETR</i>	1482	0.305	0.211	0	0.184	0.276	0.358	1
<i>CashETR</i>	1482	0.286	0.231	0	0.140	0.252	0.356	1
<i>StB</i>	1482	0.823	0.382	0	1	1	1	1
<i>R&D</i>	1482	0.020	0.037	0	0	0	0.028	0.341
<i>Size</i>	1482	20.142	2.189	14.921	18.584	19.786	21.415	26.584
<i>Lev</i>	1482	1.604	1.638	0.027	0.698	1.230	2.079	27.310
<i>PPE</i>	1482	0.422	0.195	0.001	0.283	0.395	0.566	0.997
<i>Cash</i>	1482	0.153	0.141	0.001	0.054	0.111	0.202	0.882
<i>ROA</i>	1482	0.089	0.083	0.000	0.041	0.068	0.109	1.171
<i>NOLCF</i>	1482	0.165	0.371	0	0	0	0	1
<i>Intang</i>	1482	0.186	0.173	0	0.047	0.127	0.286	0.743
<i>Acc</i>	1482	− 0.030	0.082	− 0.306	− 0.065	− 0.033	− 0.001	1.235
<i>Export</i>	1482	0.577	0.434	0	0.231	0.560	0.826	3.143
<i>Inv</i>	1482	0.129	0.114	0	0.015	0.114	0.206	0.640
<i>Big4</i>	1482	0.684	0.465	0	0	1	1	1
<i>OverallExpert</i>	1482	0.098	0.297	0	0	0	0	1
<i>TaxExpert</i>	1482	0.088	0.283	0	0	0	0	1
<i>Experience</i>	1482	1.990	0.828	− 5.207	1.633	2.113	2.564	3.678
<i>Taxfee</i>	1482	0.082	0.117	0	0	0.023	0.133	0.730

ETR effective tax rate, *CurrETR* current effective tax rate, *CashETR* cash effective tax rate, *StB* indicator variable equal to 1 if the signing engagement partner is a chartered tax consultant, *R&D* research and development expense, *Size* natural logarithm of total assets, *Lev* leverage, *PPE* net property, plant and equipment, *Cash* cash holdings, *ROA* return on assets, *NOLCF* indicator variable equal to 1 if there is a loss carryforward, *Intang* intangible assets, *Acc* total accruals, *Export* foreign sales, *Inv* inventories, *Big4* Big 4 audit firm, *OverallExpert* indicator variable equal to 1 if the audit firm is an overall expert in a given industry and city, *TaxExpert* indicator variable equal to 1 if the audit firm is a tax expert in a given industry and city, *Experience* natural logarithm of the number of years since the certification date of the signing engagement partner, *Taxfee* relative tax fees paid to the auditor

In 82.3% of all audit cases in the sample under review, the engagement partner signing the accounts is a chartered tax consultant (*StB*), a fairly high proportion. This could be because it is common for German auditors to take the state examination for tax consultants.

Table 3 provides the correlation coefficients for the model variables. The correlations between the effective tax rates are all highly significant at the 0.001 level. *StB* is either not correlated or has very small correlations with the effective tax rate measures. This result may be related to the large number of tax certified auditors in the sample, as seen in Table 2. On the other hand, a univariate result may not be observable if the effect is influenced by other variables in the model. Therefore, the role of *StB* is examined in more detail in the multivariate setting.

However, I find other interesting correlations between *StB* and control variables. Its correlation with *Experience* suggests that it has been more common for auditors

Table 3 Correlation matrix—Pearson (lower left) and Spearman (upper right)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) <i>ETR</i>		0.60	0.46	- 0.01	0.00	0.06	0.20	- 0.05	- 0.02	- 0.14
(2) <i>CurrETR</i>	0.64		0.65	0.02	0.07	0.22	0.20	0.05	- 0.08	- 0.23
(3) <i>CashETR</i>	0.53	0.69		0.02	0.07	0.28	0.24	0.09	- 0.15	- 0.19
(4) <i>StB</i>	- 0.02	0.03	0.02		- 0.05	- 0.04	0.00	- 0.01	- 0.07	- 0.02
(5) <i>R&D</i>	- 0.04	- 0.04	- 0.03	- 0.01		0.12	- 0.10	- 0.06	0.01	0.14
(6) <i>Size</i>	0.05	0.14	0.17	- 0.05	- 0.05		0.50	0.34	- 0.41	- 0.18
(7) <i>Lev</i>	0.20	0.22	0.21	- 0.05	- 0.14	0.33		0.29	- 0.42	- 0.41
(8) <i>PPE</i>	- 0.03	0.05	0.07	- 0.01	- 0.13	0.33	0.14		- 0.54	- 0.25
(9) <i>Cash</i>	- 0.02	- 0.08	- 0.08	- 0.05	0.12	- 0.38	- 0.23	- 0.55		0.30
(10) <i>ROA</i>	- 0.18	- 0.26	- 0.23	- 0.01	0.09	- 0.20	- 0.26	- 0.24	0.39	
(11) <i>NOLCF</i>	- 0.13	- 0.11	- 0.15	- 0.03	0.05	- 0.27	0.06	0.03	0.07	- 0.07
(12) <i>Intang</i>	0.02	0.05	0.04	- 0.09	0.05	0.08	0.01	0.51	- 0.20	- 0.13
(13) <i>Acc</i>	- 0.20	- 0.16	- 0.09	0.02	- 0.06	- 0.04	- 0.13	- 0.11	- 0.01	0.38
(14) <i>Export</i>	0.10	0.07	0.05	- 0.04	0.12	0.16	0.06	- 0.22	- 0.15	0.03
(15) <i>Inv</i>	0.12	0.09	0.06	0.09	0.00	- 0.01	- 0.02	- 0.31	- 0.26	- 0.06
(16) <i>Big4</i>	0.01	0.08	0.07	- 0.09	0.08	0.42	0.16	0.15	- 0.17	- 0.06
(17) <i>OverallExpert</i>	0.00	0.04	0.03	- 0.05	0.03	0.11	0.09	0.10	- 0.08	- 0.07
(18) <i>TaxExpert</i>	0.00	0.01	0.01	- 0.04	0.02	0.08	0.08	0.05	- 0.04	- 0.06
(19) <i>Experience</i>	- 0.08	- 0.01	- 0.01	0.09	0.12	0.30	0.12	0.09	- 0.14	- 0.07
(20) <i>Taxfee</i>	- 0.01	- 0.01	- 0.02	- 0.03	- 0.01	0.00	0.01	0.01	- 0.05	- 0.02
(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	
(1) <i>ETR</i>	- 0.17	0.00	- 0.19	0.10	0.13	0.00	- 0.04	- 0.03	- 0.08	0.05
(2) <i>CurrETR</i>	- 0.17	0.07	- 0.14	0.11	0.10	0.11	0.02	0.00	0.02	0.06
(3) <i>CashETR</i>	- 0.24	0.06	- 0.04	0.09	0.09	0.10	0.02	0.01	0.05	0.04

Table 3 continued

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(4) <i>StB</i>	- 0.03	-0.09	- 0.02	- 0.01	0.11	- 0.09	- 0.05	- 0.04	0.10	- 0.02
(5) <i>R&D</i>	- 0.06	0.10	- 0.01	0.26	0.13	0.11	0.02	0.03	0.12	0.03
(6) <i>Size</i>	- 0.27	0.06	- 0.01	0.20	0.10	0.42	0.11	0.09	0.30	0.11
(7) <i>Lev</i>	- 0.05	0.07	- 0.15	0.12	0.12	0.22	0.12	0.12	0.15	0.10
(8) <i>PPE</i>	0.03	0.47	- 0.17	- 0.21	- 0.23	0.14	0.10	0.06	0.10	0.00
(9) <i>Cash</i>	0.11	- 0.14	- 0.04	- 0.07	- 0.24	- 0.18	- 0.10	- 0.08	- 0.12	- 0.06
(10) <i>ROA</i>	- 0.14	- 0.07	0.21	0.10	- 0.05	- 0.08	- 0.07	- 0.06	- 0.05	- 0.03
(11) <i>NOLCF</i>	0.13	0.13	- 0.04	- 0.16	- 0.16	- 0.05	0.03	0.01	- 0.06	- 0.10
(12) <i>Intang</i>	0.13		- 0.12	- 0.05	- 0.33	0.05	0.02	0.00	0.05	0.05
(13) <i>Acc</i>	0.02	- 0.10		0.01	0.10	- 0.10	- 0.04	- 0.04	0.01	- 0.02
(14) <i>Export</i>	- 0.12	- 0.13	- 0.01		0.49	0.14	0.13	0.14	0.13	0.11
(15) <i>Inv</i>	- 0.14	- 0.38	0.10	0.46		0.06	0.01	0.01	0.00	0.10
(16) <i>Big4</i>	- 0.05	0.04	- 0.11	0.13	0.03		0.02	0.04	0.05	0.05
(17) <i>OverallExpert</i>	0.03	0.01	- 0.02	0.13	0.00	0.02		0.77	0.11	0.12
(18) <i>TaxExpert</i>	0.01	0.00	0.00	0.15	0.01	0.04	0.77		0.09	0.20
(19) <i>Experience</i>	- 0.04	0.03	- 0.01	0.10	0.00	0.04	0.10	0.09		0.00
(20) <i>Taxfee</i>	- 0.04	0.02	- 0.03	0.03	0.02	0.02	0.08	0.15	- 0.02	

Bold printed correlation coefficients show significance, at least, at the 10% level

ETR effective tax rate, *CurrETR* current effective tax rate, *CashETR* cash effective tax rate, *StB* indicator variable equal to 1 if the signing engagement partner is a chartered tax consultant, *R&D* research and development expense, *Size* natural logarithm of total assets, *Lev* leverage, *PPE* net property, plant and equipment, *Cash* cash holdings, *ROA* return on assets, *NOLCF* indicator variable equal to 1 if there is a loss carryforward, *Intang* intangible assets, *Acc* total accruals, *Export* foreign sales, *Inv* inventories, *Big4* Big 4 audit firm, *OverallExpert* indicator variable equal to 1 if the audit firm is an overall expert in a given industry and city, *TaxExpert* indicator variable equal to 1 if the audit firm is a tax expert in a given industry and city, *Experience* natural logarithm of the number of years since the certification date of the signing engagement partner, *Taxfee* relative tax fees paid to the auditor

in recent years not to become chartered tax consultants. This seems to be consistent also with the results given by Veidt and Tüffers (2015). I also find significantly less chartered tax consultants in Big 4 firms and overall expert audit offices. These correlations seem to indicate that tax certifications of individual auditors do not coincide with audit expertise on audit office or audit firm level.

4.2 Main multivariate findings

4.2.1 Plain

Table 4, Panel A reports the results obtained by estimating the regression model. As is typical for effective tax rate literature, the explanatory power of adjusted R^2 is noticeably low but reasonable in all models (for comparable levels see, e.g., Armstrong et al. 2012; Huseynov and Klamm 2012; McGuire et al. 2012).

The results indicate that engagement partners' tax certification is positively and significantly related to clients' corporate tax rate measures in two out of three cases.¹¹

It is unclear why the coefficient on *StB* is not significant when *ETR* is the dependent variable. This could be ascribed to different definitions and meanings of the respective effective tax rate. The *ETR* includes current tax expenses but also deferred tax assets and deferred tax liabilities. Thus, only with *CurrETR* and *CashETR* does it become apparent if companies undertake efforts to lower the current tax expense and cash taxes paid by deferring the latter to subsequent periods. Disclosing low current tax expenses and paying low taxes could attract the tax authorities' attention (see Bozanic et al. 2014). Tax certified individual auditors seem to be associated with a reduced risk of such attention.

As expected, the coefficient on *Taxfee* is mostly insignificant, likely because tax services provided by auditing firms are limited to tax confirmation services and may not influence the annual accounts. The coefficients on *Big4*, *OverallExpert*, and *TaxExpert* are also (mostly) insignificant. This suggests consistent with Goodwin and Wu (2014) that individuals are more important for audit outcomes than audit firms or local audit offices. *Experience* does not show the same positive association with effective tax rates like *StB* suggesting that passed time since the state examination or auditing experience act against declarative tax knowledge. The coefficient *Acc* is just inconsistently significant. This contrasts with Frank et al. (2009) who find that tax reporting aggressiveness and aggressive financial reporting occur synchronously, so further evidence may be required here.

As the main tests in Table 4, Panel A show the association of the main variable of interest with the dependent variables only multivariately and not univariately as given in Table 3, Table 4, Panel B investigates which control variables make the association appear. Table 4, Panel B shows the regression results including just the variable *StB* with fixed effects in the model. Results suggest that as soon as the

¹¹ If industry fixed effects are used instead of firm fixed effects, *StB* shows still a significant positive coefficient with a significance of 5.7% but only for *CurrETR* as dependent variable. To brevities sake results are not displayed.

Table 4 Main multivariate findings—plain

	<i>ETR</i>	<i>CurrETR</i>	<i>CashETR</i>
<i>Panel A full model^a</i>			
<i>StB</i>	0.0033 (0.846)	0.0446*** (0.010)	0.0468** (0.043)
<i>R&D</i>	0.7622 (0.115)	0.2940 (0.494)	0.7194 (0.114)
<i>Size</i>	− 0.0099 (0.754)	− 0.0119 (0.741)	− 0.0015 (0.973)
<i>Lev</i>	0.0270*** (0.000)	0.0362*** (0.000)	0.0336*** (0.000)
<i>PPE</i>	− 0.0670 (0.560)	0.0495 (0.685)	0.3480*** (0.008)
<i>Cash</i>	− 0.0212 (0.850)	0.0330 (0.791)	0.2496* (0.058)
<i>ROA</i>	− 0.4676*** (0.009)	− 1.0461*** (0.000)	− 1.3938*** (0.000)
<i>NOLCF</i>	0.0083 (0.801)	− 0.0195 (0.501)	− 0.0955*** (0.003)
<i>Intang</i>	0.1549 (0.218)	0.0755 (0.631)	− 0.2158 (0.236)
<i>Acc</i>	− 0.2163* (0.054)	0.0583 (0.649)	0.5449*** (0.000)
<i>Export</i>	0.0032 (0.923)	− 0.0049 (0.905)	− 0.0505 (0.294)
<i>Inv</i>	0.2045 (0.265)	0.2477 (0.308)	0.2428 (0.339)
<i>Big4</i>	− 0.0087 (0.756)	− 0.0015 (0.961)	− 0.0361 (0.302)
<i>OverallExpert</i>	− 0.0355 (0.498)	− 0.0146 (0.780)	− 0.1325* (0.058)
<i>TaxExpert</i>	− 0.0038 (0.927)	− 0.0605 (0.179)	− 0.0037 (0.945)
<i>Experience</i>	− 0.0202** (0.026)	− 0.0065 (0.425)	− 0.0222** (0.027)
<i>Taxfee</i>	0.0420 (0.434)	0.1227* (0.086)	− 0.0353 (0.661)
<i>Constant</i>	0.4816 (0.447)	0.4544 (0.527)	0.2978 (0.734)
<i>Firm and year fixed effects</i>	Yes	Yes	Yes
Observations	1482	1482	1482
Adjusted <i>R</i> ²	0.098	0.154	0.163
<i>F</i>	5.0574	3.6230	6.1664
<i>p</i>	0.0000	0.0000	0.0000
<i>Panel B StB and fixed effects^b</i>			
<i>StB</i>	− 0.0010 (0.954)	0.0491*** (0.004)	0.0431* (0.083)
<i>Constant</i>	0.2924*** (0.000)	0.2306*** (0.000)	0.2276*** (0.000)
<i>Firm and year fixed effects</i>	Yes	Yes	Yes
Observations	1482	1482	1482
Adjusted <i>R</i> ²	0.007	0.016	0.017
<i>F</i>	2.2967	3.1681	3.6700
<i>p</i>	0.0349	0.0050	0.0016

p values in parentheses; * *p* ≤ 0.10; ** *p* ≤ 0.05; *** *p* ≤ 0.01 (two-tailed); standard errors clustered by firm

Rate placeholder for *ETR*, *CurrETR*, and *CashETR*, *ETR* effective tax rate, *CurrETR* current effective tax rate, *CashETR* cash effective tax rate, *StB* indicator variable equal to 1 if the signing engagement partner is a chartered tax consultant, *R&D* research and development expense, *Size* natural logarithm of total assets, *Lev* leverage, *PPE* net property, plant and equipment, *Cash* cash holdings, *ROA* return on assets, *NOLCF* indicator variable equal to 1 if there is a loss carryforward, *Intang* intangible assets, *Acc* total accruals, *Export* foreign sales, *Inv* inventories, *Big4* Big 4 audit firm, *OverallExpert* indicator variable equal to 1 if the audit firm is an overall expert in a given industry and city, *TaxExpert* indicator variable equal to 1 if the audit firm is a tax expert in a given industry and city, *Experience* natural logarithm of the number of years since the certification date of the signing engagement partner, *Taxfee* relative tax fees paid to the auditor, *Firm* firm fixed effects, *Year* year fixed effects

^a The sample comprises 1482 observations of 300 German enterprises from 2008 to 2014. This table reports results given by the following regression models in order to investigate the association of tax certified individual auditors with three different effective tax rates: $Rate = \beta_0 + \beta_1 StB + \beta_m \sum Controls + \beta_i \sum Firm + \beta_j \sum Year + \varepsilon$

^b The sample comprises 1482 observations of 300 German enterprises from 2008 to 2014. This table reports results given by the following regression models in order to investigate the association of tax certified individual auditors with three different effective tax rates without controls: $Rate = \beta_0 + \beta_1 StB + \beta_i \sum Firm + \beta_j \sum Year + \varepsilon$

model controls for everything that is constant within a firm over the observation period, individual auditors that are also chartered tax consultants seem to matter for current and cash effective tax rates. Nevertheless, the regression models' explanatory power benefits significantly from including also firm-level controls like shown in Table 4, Panel A.

4.2.2 *Controlling for observable auditor characteristics and determinants of firm-level auditor choice*

Prior research already reveals that companies consciously decide to appoint their audit firm for tax services (Lassila et al. 2010; McGuire et al. 2012). Accordingly, the research design chosen may also suffer from different observable and unobservable factors that could affect the association found between tax certified individual auditors and effective tax rates. To address this issue, I regard at least three of multiple potential layers of selection biases that are likely to be related with choices of and for tax certified individual auditors: First, it is common in Germany for candidates for the state examination for certified auditors to have already qualified as chartered tax consultants. This is their individual choice and may be due to a certain kind of risk aversion in order to reduce their extent of exams in the state examination for auditors resulting in a lower risk of failure or other personal characteristics or circumstances. Therefore, being an auditor who is also tax certified may be accompanied by specific personal values of auditors like the tendency to be risk averse for instance that could lead to the revealed association instead of the individual auditor's tax certification. Second, companies may consciously appoint their individual auditors to be tax or non-tax certified depending on the company's operational complexity, tax strategy, or monitoring strength since some prior studies already reveal that these aspects are related to firms retaining their auditors to provide tax services (Lassila et al. 2010; McGuire et al. 2012). Companies could be aware of the auditor's professional responsibility and concern about his/her reputation leading to corporations having higher effective tax rates. Companies could consciously choose tax certified individual auditors in attempts to create more perceived auditor independence and to deal with the risk of being detected by tax authorities. And finally, also specific audit firms may hire tax certified auditors more likely or tax certified auditors may select into specific audit firms that are bigger or more specialized than others.

To explore whether the associations documented in Table 4 are driven by observable covariates potentially explaining the selection issues mentioned above, I apply entropy balancing. To do so, I reweight the dataset by adjusting inequalities between auditors who are not chartered tax consultants ($StB = 0$) and auditors who are ($StB = 1$) (Hainmueller 2012). Some of the instruments I use are based on Lassila et al. (2010) and McGuire et al. (2012). But I also add some other covariates like individual auditor characteristics and audit firm-specific characteristics as instruments to control for the effects of auditors' personal values, monitoring strength, and audit firms' selection for the appointed auditor being also certified tax consultant. All instruments which are used for the subsequent entropy balancing are given in Table 5, Panel A, structured by the respective theory, and described in the

Table 5 Main multivariate findings—controlling for observable auditor characteristics and determinants of firm-level auditor choice

	Unweighted sample			Weighted sample	
	<i>StB</i> = 1 No. of observations = 1219	<i>StB</i> = 0 No. of observations = 263	<i>p</i> > z	<i>StB</i> = 1	<i>StB</i> = 0
<i>Panel A</i> descriptive statistics for auditors <i>with</i> versus <i>without</i> tax certification ^a					
Individual auditor choice					
<i>Experience</i>	2.024 ^{***}	1.832	0.000	2.024	2.024
<i>Gender</i>	0.158 [*]	0.118	0.097	0.158	0.158
<i>PhD</i>	0.084 ^{**}	0.133	0.014	0.085	0.085
Company selection					
Firm complexity					
<i>CapitalIntensity</i>	4.798	9.252	0.952	4.798	4.798
<i>Size</i>	20.088	20.396	0.114	20.090	20.090
<i>Lev</i>	1.570	1.766	0.849	1.570	1.570
<i>R&D</i>	0.020 [*]	0.021	0.051	0.020	0.020
<i>NOLCF</i>	0.159	0.190	0.220	0.159	0.159
<i>ROA</i>	0.089	0.091	0.443	0.089	0.089
Tax strategy					
<i>DummyForeignTax</i>	0.263	0.285	0.468	0.263	0.263
<i>ForeignTax</i>	0.003	0.004	0.369	0.003	0.003
Monitoring strength					
<i>IRSStrength</i>	47.701 ^{**}	49.538	0.028	47.700	47.700
<i>Taxfee</i>	0.080	0.090	0.482	0.080	0.080
<i>AudIndep</i>	0.096	0.106	0.582	0.096	0.096
<i>Tenure</i>	9.501 ^{***}	10.741	0.001	9.501	9.501
<i>Acc</i>	− 0.029	− 0.033	0.409	− 0.029	− 0.029
<i>LNAF</i>	12.765 ^{**}	12.958	0.045	12.770	12.770
<i>AuditfirmChange</i>	0.083 ^{**}	0.038	0.012	0.083	0.083
Audit firm selection					
<i>Big4</i>	0.664 ^{***}	0.776	0.000	0.665	0.665
<i>OverallExpert</i>	0.091 [*]	0.129	0.059	0.091	0.091
<i>TaxExpert</i>	0.083	0.110	0.154	0.083	0.083
	<i>ETR</i>	<i>CurrETR</i>		<i>CashETR</i>	
<i>Panel B</i> multivariate regression results after entropy balancing ^b					
<i>StB</i>	0.0112 (0.439)	0.0482 ^{***} (0.001)		0.0554 ^{***} (0.003)	
<i>R&D</i>	1.1959 ^{***} (0.009)	0.3960 (0.325)		0.8514 [*] (0.065)	
<i>Size</i>	− 0.0262 (0.412)	− 0.0519 (0.215)		− 0.0563 (0.274)	
<i>Lev</i>	0.0285 ^{***} (0.000)	0.0394 ^{***} (0.000)		0.0309 ^{***} (0.000)	
<i>PPE</i>	0.2092 (0.134)	0.2047 (0.110)		0.4729 ^{***} (0.000)	
<i>Cash</i>	0.1553 (0.161)	0.1805 (0.130)		0.3312 ^{**} (0.012)	
<i>ROA</i>	− 0.5530 ^{***} (0.001)	− 1.0969 ^{***} (0.000)		− 1.5921 ^{***} (0.000)	

Table 5 continued

	<i>ETR</i>	<i>CurrETR</i>	<i>CashETR</i>
<i>NOLCF</i>	− 0.0231 (0.451)	− 0.0534* (0.068)	− 0.0962*** (0.001)
<i>Intang</i>	0.0726 (0.634)	0.2177 (0.196)	− 0.1217 (0.542)
<i>Acc</i>	− 0.2562** (0.027)	0.0703 (0.564)	0.5196*** (0.000)
<i>Export</i>	0.0101 (0.754)	− 0.0140 (0.737)	− 0.0549 (0.260)
<i>Inv</i>	0.3598** (0.047)	0.3580 (0.122)	0.0952 (0.732)
<i>Big4</i>	0.0036 (0.866)	0.0121 (0.598)	0.0023 (0.943)
<i>OverallExpert</i>	− 0.0657 (0.168)	− 0.0194 (0.620)	− 0.1730** (0.017)
<i>TaxExpert</i>	− 0.0116 (0.718)	− 0.0638* (0.077)	0.0225 (0.602)
<i>Experience</i>	− 0.0270*** (0.003)	− 0.0140 (0.105)	− 0.0293*** (0.004)
<i>Taxfee</i>	0.0046 (0.946)	0.0696 (0.402)	− 0.1278 (0.293)
<i>Constant</i>	1.2732** (0.046)	2.1428** (0.038)	2.1157* (0.100)
<i>Firm and year fixed effects</i>	Yes	Yes	Yes
Observations	1482	1482	1482
Adjusted R^2	0.440	0.470	0.389
<i>F</i>	4.6046	4.6657	7.2013
<i>p</i>	0.0000	0.0000	0.0000

p values in parentheses; * $p \leq 0.10$; ** $p \leq 0.05$; *** $p \leq 0.01$ (two-tailed); robust standard errors according to Huber (1967) and White (1980)

Rate placeholder for *ETR*, *CurrETR*, and *CashETR*, *ETR* effective tax rate, *CurrETR* current effective tax rate, *CashETR* cash effective tax rate, *StB* indicator variable equal to 1 if the signing engagement partner is a chartered tax consultant, *R&D* research and development expense, *Size* natural logarithm of total assets, *Lev* leverage, *PPE* net property, plant and equipment, *Cash* cash holdings, *ROA* return on assets, *NOLCF* indicator variable equal to 1 if there is a loss carryforward, *Intang* intangible assets, *Acc* total accruals, *Export* foreign sales, *Inv* inventories, *Big4* Big 4 audit firm, *OverallExpert* indicator variable equal to 1 if the audit firm is an overall expert in a given industry and city, *TaxExpert* indicator variable equal to 1 if the audit firm is a tax expert in a given industry and city, *Experience* natural logarithm of the number of years since the certification date of the signing engagement partner, *Taxfee* relative tax fees paid to the auditor, *IRSStrength* enforcement strength of local tax authority, *DummyForeignTax* indicator variable equal to 1 if current foreign income taxes for year *t* are greater than 0, *ForeignTax* current foreign income taxes, *CapitalIntensity* sales divided by net property, plant and equipment, *AudIndep* total non-audit fees minus tax fees paid to the auditor relative to total fees paid, *Tenure* number of years the firm has been audited by the same audit firm, *LNAF* natural logarithm of audit fees paid to the auditor, *Audit-firmChange* indicator variable equal to 1 if the company switched the audit firm in the current year, *Gender* indicator variable equal to 1 if the individual auditor is female, *PhD* indicator variable equal to 1 if the individual auditor holds a PhD title, *Firm* firm fixed effects, *Year* year fixed effects

^a This table shows means of company, audit firm, and individual auditor characteristics for auditors *with* versus *without* tax certification both for the unweighted sample addressed in Table 4 and for the weighted sample addressed in this Table, Panel B generated by entropy balancing. A two-tailed Mann–Whitney-U test is conducted in order to test for differences in mean values before weighting

^b This table shows the results given by regression model (1) after entropy balancing. The criteria set for the weighted sample can be found in Panel A. The sample comprises 1482 observations of 300 German enterprises from 2008 to 2014: $Rate = \beta_0 + \beta_1 StB + \beta_m \sum Controls + \beta_i \sum Firm + \beta_t \sum Year + \varepsilon$

Appendix. Table 5, Panel A provides means of the respective variables split between $StB = 1$ and $StB = 0$. Before the rebalancing, a lot of significant differences between auditors who are and who are not certified tax consultants can be revealed by Mann–Whitney-U tests. When conducting the entropy balancing I adjust on the first moment for all covariates. This reweighting eliminates the previously seen differences in characteristics and balances the covariates' distributions on 1219 total weights (see Table 5, Panel A, weighted sample). Afterwards I run the regression Eq. (1) with these balanced data to reduce heterogeneity and bias of the sample.¹² Consequently, the results still reveal positive coefficients for StB when $CurrETR$ and $CashETR$ are dependent variables (see Table 5, Panel B). In the following tests I also use the weighted sample to validate and interpret the previous results.¹³

To avoid potential distortions due to the financial crisis that occurred during the observation period, in addition to integrating year fixed effects the regression is also conducted excluding the years 2008 and 2009. The results are not displayed for brevity's sake. This notwithstanding, the shorter observation period still shows significant positive coefficients for StB with $CurrETR$ and $CashETR$ as dependent variables.

4.2.3 Tax certified individual auditor change

Numerous other studies have already shown that short audit tenures, i.e., frequent auditor changeover, impact negatively on the quality of the accounts since the incoming auditors lack knowledge that is specific to the client or because such knowledge is lost in the course of the changeover (Chen et al. 2008; Knechel and Sharma 2012; Quick and Wiemann 2011). To ensure that the results given are not driven by few change observations and changes of audit firms, I run a time-series based change analysis on tax certified individual auditor changes. For doing so I, first, estimate residual tax rate measures on the full entropy balanced sample by using all control variables of regression Eq. (1). Then, I calculate changes in residual tax rate measures and restrict afterwards the sample to those firms which do not switch their audit firm in the respective year but change individual auditors from a non-tax certified to a tax certified individual auditor ($StBChange = 1$) or vice versa ($StBChange = 0$). To illustrate the results, Table 6, Panel A shows the mean development of residual effective tax rates pre and post $StBChange$. Finally, I run a

¹² Because fixed effects models of panel data analyses require weights to be consistent within firms from a statistical perspective, the balanced sample needs to be calculated by an ordinary least squares regression with firm and year fixed effects and robust standard errors according to Huber (1967) and White (1980). I refrain from clustering standard errors according to Petersen (2009) in the ordinary least squares regression because this adjusts the degrees of freedom by the number of fixed effects swept away in the within-group transformation and ignores correlation across groups (Wooldridge 2010). This will lead to too big standard errors. The adjusted R^2 is also slightly higher in ordinary least squares regressions with firm and year fixed effects because the variance explained by these fixed effects is included for calculating the adjusted R^2 .

¹³ For robustness checks I also conduct a nearest neighbour propensity score matching with no replacement (one-to-one matching). This approach reduces the sample size to 522 observations but results remain the same.

Table 6 Main multivariate findings—tax certified individual auditor change

Panel A development of mean residual tax rates pre and post StBChange^{a,b}

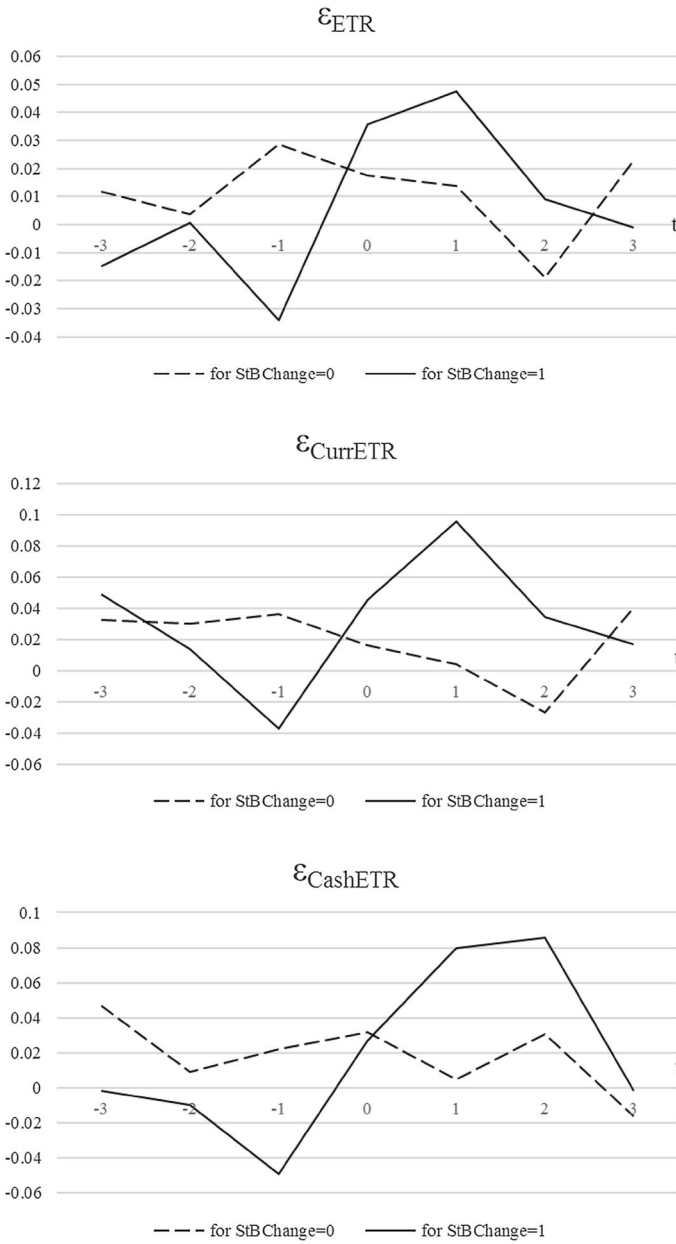


Table 6 continued

	Δe_{ETR}	$\Delta e_{CurrETR}$	$\Delta e_{CashETR}$
<i>Panel B</i> change analysis ^c			
<i>StBChange</i>	0.0685 (0.197)	0.1194** (0.017)	0.0843 (0.130)
<i>Constant</i>	− 0.0154 (0.547)	− 0.0355 (0.246)	− 0.0185 (0.646)
Observations	68	68	68
Adjusted R^2	0.014	0.070	0.016
<i>F</i>	1.7002	5.9677	2.3534
<i>p</i>	0.1968	0.0173	0.1298

p values in parentheses; * $p \leq 0.10$; ** $p \leq 0.05$; *** $p \leq 0.01$ (two-tailed); robust standard errors according to Huber (1967) and White (1980)

Rate placeholder for *ETR*, *CurrETR*, and *CashETR*, *ETR* effective tax rate, *CurrETR* current effective tax rate, *CashETR* cash effective tax rate, e_{Rate} placeholder for residual tax rates e_{ETR} , $e_{CurrETR}$, and $e_{CashETR}$, e_{ETR} residual effective tax rate, $e_{CurrETR}$ residual current effective tax rate, $e_{CashETR}$ residual cash effective tax rate, Δe_{Rate} placeholder for Δe_{ETR} , $\Delta e_{CurrETR}$, and $\Delta e_{CashETR}$, Δe_{ETR} change in residual effective tax rate, $\Delta e_{CurrETR}$ change in residual current effective tax rate, $\Delta e_{CashETR}$ change in residual cash effective tax rate, *StBChange* indicator variable equal to 1 if the company changes from a non-tax certified engagement partner to a tax certified auditor, 0 vice versa, *Firm* firm fixed effects, *Year* year fixed effects

^a These graphs show the mean development of residual tax rates (e_{Rate}) pre and post *StBChange* if individual auditors change in $t = 0$ from a non-tax certified auditor to a tax certified auditor (*StBChange* = 1) or vice versa (*StBChange* = 0)

^b To calculate the tax rate residuals e_{Rate} , I use the entropy balanced sample with 1482 observations of 300 German enterprises from 2008 to 2014 in the following regression: $Rate = \beta_0 + \beta_m \sum Controls + \beta_i Firm + \beta_j \sum Year + e_{Rate}$. e_{Rate} is used as a dependent variable for the following results shown in this Table, Panel B

^c This table reports results given by a time-series based change analysis on tax certified individual auditor changes. If *StBChange* shows still a significant positive association with the change in effective tax rate residuals (Δe_{Rate}), previous main results are not driven by few change observations between non-tax certified and tax certified auditors and audit firm changes. The sample comprises 68 observations of 60 German enterprises from 2009 to 2014: $\Delta e_{Rate} = \beta_0 + \beta_1 StBChange + \varepsilon$

regression on the residual tax rate changes (Δe_{ETR} , $\Delta e_{CurrETR}$, $\Delta e_{CashETR}$) and tax certified auditor changes (*StBChange*). In line with previously shown results, I would still expect positive signs for *StBChange* if individual auditors change from a non-tax certified to a tax certified auditor and other aspects of the economic system remain unaffected (Dhaliwal et al. 2013; Larcker and Rusticus 2010). The results given in Table 6, Panel B reveal that the coefficient is positive for all regression models and significant for $\Delta e_{CurrETR}$. This finding suggests that changing the individual auditor to a tax certified auditor makes a difference for the level of reported effective tax rates even if the audit firm stays the same and it might be assumed that client-specific documents were passed to the new engagement partner so that client-specific knowhow could be carried over to the subsequent auditor.

4.3 Additional analyses and robustness checks

4.3.1 Tests for knowledge spillover effects

Prior international studies interpret auditors' association with tax avoidance as reflecting the impact of knowledge spillover effects (Christensen et al. 2015; Gleason and Mills 2011; Hogan and Noga 2012; McGuire et al. 2012). To get a better understanding of the association between tax certified individual auditors and effective tax rates, I examine in further tests whether knowledge spillover effects may be also relevant for the associations found so far. When a dummy variable for the provision of tax confirmation services (*TaxfeeDummy*) is moderated with individual auditors that are also tax certified, the significant coefficient on *StB* disappears and the coefficient on the interaction term turns to be significantly positive (Table 7, Panel A). These results provide evidence that the association of individual auditors who are also chartered tax consultants is assisted by the provision of tax confirmation services. This finding suggests consistent with prior research that rendering additional services plays an important role in auditors' assessment (Christensen et al. 2015; Gleason and Mills 2011; Hogan and Noga 2012). Because the coefficient on the control variable *Taxfee* is insignificant or significantly positive, impaired auditor independence is not an issue as suggested earlier. Results reveal that tax certification of individual auditors dominates over and contrasts to the effect of providing tax services designed to exclusively confirm tax arrangements that the client or the client's tax preparer has already made when individual auditors are no tax consultants.

However, the enforcement capability of the client's competent tax authority influences the level of effective tax rates and generates spillover effects for the auditor's assessment (Janssen 2015). If the authority's enforcement is strong, companies will be more hesitant to take a tax-aggressive position. Individual auditors in general need to be less concerned about high effective tax rates and tax certifications will be less necessary for assessing tax-related financial items. The German tax system as a whole can be considered to be subject to fairly average tax enforcement (Atwood et al. 2012). However, enforcement strength in Germany differs by local tax authority (see survey by Klimasch and Prudent 2005), requiring, therefore, to distinguish tax enforcement strength depending on domiciles of headquarters. In line with Janssen (2015), I include *IRSStrength* as an interaction term with *StB* to control for the enforcement strength of the competent local tax authority depending on company headquarters and its relevance for the connection between *StB* and *Rate*. *IRSStrength* is based on a survey of chartered tax consultants by Klimasch and Prudent (2005). The authors rank the expected monitoring strength of all 575 German tax authorities depending on the tax offices' experience. The individual scores of the local tax authorities generated by the survey are matched to the postcodes of the sample companies' headquarters to identify the strength of tax enforcement that apply to the companies. *IRSStrength* can take values up to 100,

Table 7 Robustness checks—knowledge spillover effects

	<i>ETR</i>	<i>CurrETR</i>	<i>CashETR</i>
<i>Panel A</i> tax confirmation services ^a			
<i>StB</i>	− 0.0322 (0.206)	− 0.0090 (0.709)	0.0038 (0.909)
<i>TaxfeeDummy</i>	− 0.0825** (0.018)	− 0.1028*** (0.004)	− 0.0697 (0.130)
<i>StB*TaxfeeDummy</i>	0.0693** (0.034)	0.0915*** (0.005)	0.0837** (0.043)
<i>Taxfee</i>	0.0750 (0.240)	0.1513* (0.072)	− 0.0984 (0.480)
<i>Controls</i>	Yes	Yes	Yes
<i>Firm and year fixed effects</i>	Yes	Yes	Yes
Observations	1482	1482	1482
Adjusted R^2	0.445	0.477	0.392
<i>F</i>	4.3667	4.5883	6.8107
<i>p</i>	0.0000	0.0000	0.0000
<i>Panel B</i> enforcement strength of the responsible tax authority ^b			
<i>StB</i>	0.0472 (0.519)	0.1588** (0.017)	0.2311*** (0.005)
<i>StB*IRSStrength</i>	− 0.0007 (0.590)	− 0.0023* (0.067)	− 0.0036** (0.024)
<i>Controls</i>	Yes	Yes	Yes
<i>Firm and year fixed effects</i>	Yes	Yes	Yes
Observations	1482	1482	1482
Adjusted R^2	0.440	0.471	0.391
<i>F</i>	4.4422	4.5078	7.1768
<i>p</i>	0.0000	0.0000	0.0000
<i>Panel C</i> joint effect of individual auditors' expertise ^c			
<i>StB</i>	0.0007 (0.985)	0.0000 (0.999)	− 0.0070 (0.883)
<i>Experience</i>	− 0.0311** (0.027)	− 0.0328** (0.022)	− 0.0538*** (0.008)
<i>StB*Experience</i>	0.0057 (0.739)	0.0261 (0.144)	0.0339 (0.121)
<i>Controls</i>	Yes	Yes	Yes
<i>Firm and year fixed effects</i>	Yes	Yes	Yes
Observations	1482	1482	1482
Adjusted R^2	0.440	0.471	0.390
<i>F</i>	4.4933	4.6451	7.0945
<i>p</i>	0.0000	0.0000	0.0000

Table 7 continued

p values in parentheses; * $p \leq 0.10$; ** $p \leq 0.05$; *** $p \leq 0.01$ (two-tailed); robust standard errors according to Huber (1967) and White (1980)

Rate placeholder for *ETR*, *CurrETR*, and *CashETR*, *ETR* effective tax rate, *CurrETR* current effective tax rate, *CashETR* cash effective tax rate, *StB* indicator variable equal to 1 if the signing engagement partner is a chartered tax consultant, *Experience* natural logarithm of the number of years since the certification date of the signing engagement partner, *Taxfee* relative tax fees paid to the auditor, *TaxfeeDummy* indicator variable equal to 1 if the audit firm provides tax confirmation services in the current year, *IRSSStrength* enforcement strength of local tax authority, *Firm* firm fixed effects, *Year* year fixed effects

^a The entropy balanced sample comprises 1482 observations of 300 German enterprises from 2008 to 2014. This table reports results given by the following regression model which investigates the relevance of providing tax confirmation services for the association between *StB* and effective tax rates. If the interaction term shows significant positive signs, services rendered by the tax department may assist tax certified individual auditors' positive interaction of *StB* and corporate tax rates: $Rate = \beta_0 + \beta_1 StB + \beta_2 TaxfeeDummy + \beta_3 StB * TaxfeeDummy + \beta_m \sum Controls + \beta_i \sum Firm + \beta_r \sum Year + \varepsilon$

^b The entropy balanced sample comprises 1482 observations of 300 German enterprises from 2008 to 2014. This table reports results given by the following regression model which investigates the relevance of enforcement strength by the responsible local tax authority for the association between *StB* and effective tax rates. If the interaction term shows significant negative signs, knowledge spillover effects may be the reason for a positive interaction of *StB* and corporate tax rates: $Rate = \beta_0 + \beta_1 StB + \beta_2 StB * IRSSStrength + \beta_m \sum Controls + \beta_i \sum Firm + \beta_r \sum Year + \varepsilon$

^c The entropy balanced sample comprises 1482 observations of 300 German enterprises from 2008 to 2014. This table reports results given by the following regression model which investigates the joint effect of tax certification and auditing experience of individual auditors: $Rate = \beta_0 + \beta_1 StB + \beta_2 Experience + \beta_3 StB * Experience + \beta_m \sum Controls + \beta_i \sum Firm + \beta_r \sum Year + \varepsilon$

with higher values representing stricter enforcement.¹⁴ The interaction term with *IRSSStrength* shows that the magnitude of the coefficient for individual auditors that are also chartered tax consultants is reduced if enforcement by the local tax authority is stronger. However, *StB* still shows significance (see Table 7, Panel B). This is in line with the findings by Janssen (2015) that a strong tax authority generates spillover effects for the auditor.

In a further test I examine the joint presence of tax certified individual auditors and auditing experience to observe which knowhow dominates. For this purpose, *StB* and *Experience* are interacted. All remaining controls of the regression Eq. (1) stay the same. The results are given in Table 7, Panel C. The interaction terms show positive signs but no significance. Results suggest that auditing experience and being tax certified is not connected for the association with effective tax rates.

4.3.2 Tests on individual auditor involvement

When investigating internationally operating multinational enterprises based in Germany with many, even foreign, subsidiaries it might be doubted that a single individual auditor is associated with the whole group's reported level of effective

¹⁴ From a statistical perspective *IRSSStrength* needs to be included via an interaction term since this variable is constant over time and time-invariant variables are otherwise not permitted in fixed effects analyses (Wooldridge 2010). In further tests a fixed effects transformation is also conducted for the unweighted sample following Wooldridge (2010), leading to comparable results.

tax rates. To address this issue, I run several additional tests. First, I rerun the entropy balanced sample by interacting companies' *Size* with tax certified individual auditors since the involvement of the individual auditor might be higher the smaller the group gets. Results given in Table 8, Panel A show for *ETR* and *CurrETR* no association with the interaction term. For *CashETR* I find, by contrast, that the association between tax certified individual auditors and cash effective tax rates is more pronounced the bigger corporate clients are.¹⁵

Further, I match individual auditors' signatures of the consolidated IFRS financial statements with individual German GAAP balance sheet data of the parent company to estimate the more immediate tax relevant association between tax certified individual auditors and effective tax rates in Germany. Foreign subsidiaries' efforts to reduce tax rates might be out of the reach of German individual auditors and distort the previously shown associations to some extent. Groups will, as already stated earlier, optimize their IFRS tax accounts to be competitive and provide information to investors. One way to do so is to optimize only tax statements. Since IFRS and tax law are not aligned in Germany, IFRS accounting earnings will not be affected by efforts to reduce tax payments but might be biased by earnings management. By contrast, German GAAP and tax law face a high book-tax conformity. Effective tax rates consistent with German GAAP will, therefore, provide measures that are closer related to tax avoidance implemented in tax statements. This holds especially as it can be assumed that German listed companies will use their individual German GAAP statements primarily for tax reasons because capital market relevant information is already provided by IFRS consolidated statements (Zinn and Spengel 2012). Earnings management can therefore be assumed to be rarely present. Moreover, most national companies within a group consolidate their accounts for tax reasons with profit transfer agreements ('*steuerliche Organschaft*') so that the profits of all German subsidiaries are still pooled in the individual German GAAP statement of the parent. These tax rates will consequently be a reflection of the group's level of reported corporate effective tax rates in Germany.

Because cash taxes paid are not provided by individual financial statements according to German GAAP, *ETRGAAP* and *CurrETRGAAP* are the effective tax rates applicable for this setting.¹⁶ I run the regression similar to Eq. (1) after running

¹⁵ Another sensitivity test uses instead of one-year effective tax rates three-year effective, three-year current, and three-year cash effective tax rates measured by Dyreng et al. (2008) as response variables. Since it can be assumed that auditors who are also chartered tax consultants will not affect effective tax rates for past years, longer-run three-year effective tax rates are measured here by summing numerators and denominators of tax rates over the current and following 2 years according to Mayberry et al. (2015). This procedure reduces the sample to 954 observations. Even using forward looking longer term effective tax rates shows evidence for significant positive associations between *StB* and longer-run effective and current corporate effective tax rates.

¹⁶ This procedure leaves me with a sample size of 1008 observations. This sample size results from the fact that, apart from the same sample requirements set like for the original sample, companies which engage different audit firms for their individual and consolidated financial statements are excluded from the analyses since another engagement partner from another audit firm might distract the association found for the observed engagement partner. For the following regression models, control variables which are related to balance sheet items are taken from the individual financial statements. Variables controlling for information related to auditors are taken from the consolidated financial statements.

Table 8 Robustness checks—individual auditor involvement

	<i>ETR</i>	<i>CurrETR</i>	<i>CashETR</i>
<i>Panel A</i> company size ^a			
<i>StB</i>	− 0.1799 (0.154)	− 0.1439 (0.306)	− 0.4099** (0.021)
<i>Size</i>	− 0.0328 (0.307)	− 0.0585 (0.169)	− 0.0724 (0.170)
<i>StB*Size</i>	0.0095 (0.118)	0.0095 (0.171)	0.0231*** (0.006)
<i>Controls</i>	Yes	Yes	Yes
<i>Firm and year fixed effects</i>	Yes	Yes	Yes
Observations	1482	1482	1482
Adjusted R^2	0.441	0.471	0.393
<i>F</i>	4.4789	4.5012	7.4262
<i>p</i>	0.0000	0.0000	0.0000
	<i>ETRGAAP</i>	<i>CurrETRGAAP</i>	
<i>Panel B</i> individual financial statements according to German GAAP ^b			
<i>StB</i>	0.0800*** (0.003)	0.0945*** (0.000)	
<i>Controls</i>	Yes	Yes	
<i>Firm and year fixed effects</i>	Yes	Yes	
Observations	1008	1008	
Adjusted R^2	0.420	0.413	
<i>F</i>	5.7597	10.1437	
<i>p</i>	0.0000	0.0000	

Table 8 continued

p values in parentheses; * $p \leq 0.10$; ** $p \leq 0.05$; *** $p \leq 0.01$ (two-tailed); robust standard errors according to Huber (1967) and White (1980)

Rate placeholder for *ETR*, *CurrETR*, and *CashETR*, *ETR* effective tax rate, *CurrETR* current effective tax rate, *CashETR* cash effective tax rate, *RateGAAP* placeholder for *ETRGAAP* and *CurrETRGAAP*, *ETRGAAP* effective tax rate, *CurrETRGAAP* current effective tax rate, *StB* indicator variable equal to 1 if the signing engagement partner is a chartered tax consultant, *Size* natural logarithm of total assets, *SizeGAAP* natural logarithm of total assets, *LevGAAP* leverage, *PPEGAAP* net property, plant and equipment, *CashGAAP* cash holdings, *NOLCFGAAP* indicator variable equal to 1 if there is a loss carryforward, *ROAGAAP* return on assets, *IntangGAAP* intangible assets, *AccGAAP* total accruals, *ExportGAAP* foreign sales, *InvGAAP* inventories, *Big4* Big 4 audit firm, *OverallExpert* indicator variable equal to 1 if the audit firm is an overall expert in a given industry and city, *TaxExpert* indicator variable equal to 1 if the audit firm is a tax expert in a given industry and city, *Experience* natural logarithm of the number of years since the certification date of the signing engagement partner, *Taxfee* relative tax fees paid to the auditor, *Firm* firm fixed effects, *Year* year fixed effects

^a The entropy balanced sample comprises 1482 observations of 300 German enterprises from 2008 to 2014. This table reports results given by the following regression model which investigates the joint effect of tax certified individual auditors and corporate client size: $Rate = \beta_0 + \beta_1 StB + \beta_2 Size + \beta_3 StB * Size + \beta_m \sum Controls + \beta_i \sum Firm + \beta_j \sum Year + \varepsilon$

^b This table shows the results given by the following regression model after entropy balancing for $StB = 1$ and $StB = 0$ on German GAAP financial statement data (not displayed). The criteria set for the weighted sample are the following: *IRSStrength*, *CapitalIntensityGAAP*, *Taxfee*, *AudIndep*, *Tenure*, *SizeGAAP*, *LevGAAP*, *NOLCFGAAP*, *ROAGAAP*, *AccGAAP*, *LNAF*, *AuditorChange*, *Big4*, *OverallExpert*, *TaxExpert*, *Experience*, *Gender*, *PhD*. Variable descriptions can be found in the Appendix. The sample comprises 1008 observations of 220 German enterprises from 2008 to 2014: $RateGAAP = \beta_0 + \beta_1 StB + \beta_2 SizeGAAP + \beta_3 LevGAAP + \beta_4 PPEGAAP + \beta_5 CashGAAP + \beta_6 ROAGAAP + \beta_7 NOLCFGAAP + \beta_8 IntangGAAP + \beta_9 AccGAAP + \beta_{10} ExportGAAP + \beta_{11} InvGAAP + \beta_{12} Big4 + \beta_{13} OverallExpert + \beta_{14} TaxExpert + \beta_{15} Experience + \beta_{16} Taxfee + \beta_i \sum Firm + \beta_j \sum Year + \varepsilon$

a similar entropy balancing like in Table 5. However, for doing so, I adjust both the entropy balancing and the regression equation for those numbers provided by individual financial statements according to German GAAP (entropy balancing not displayed to brevity's sake). The respective results are given in Table 8, Panel B and show that the association of individual engagement partners with tax certification is even stronger for the parents' individual financial statement. These results indicate that the association found between individual auditors and the reported level of corporate effective tax rates on the consolidated group level still holds for individual financial statements consistent with German GAAP.

The study has indeed shown that individual auditors that are certified tax consultants are associated with effective tax rates. Concerning the link between audit quality (or earnings management) and effective tax rates (or tax avoidance), there has been mixed evidence to date. Frank et al. (2009) show that firms manage book income upwards and taxable income downwards in the same reporting period. Hanlon, Krishnan, and Mills (2012) show that auditors, too, are concerned about earnings management if book-tax differences are high, which leads to higher audit fees. However, both Erickson et al. (2004) and Lennox et al. (2013) cannot find a correlation between tax avoidance and fraudulent earnings management. Yet in this study the association between tax certified individual auditors and audit quality

remains unclear. I hence use the regression model (1) with the IFRS consolidated annual financial statement dataset and *Acc* as the dependent variable for measuring audit quality, accompanied by the respective tax rates as control variables. Multivariate results reveal no association between tax certified individual auditors and audit quality (not reported for brevity's sake).¹⁷

5 Summary and conclusions

Prior research has found that audit firm expertise is linked with tax avoidance (McGuire et al. 2012; Richardson et al. 2013) and that individual auditors matter to audit quality (Gul et al. 2013; Knechel et al. 2015). This study examines whether tax certified individual auditors are associated with reported corporate effective tax rates.

I use a sample of individual auditors of German listed non-financial enterprises signing audit opinions and match their names with their individual tax-related qualifications (information provided by the German Chamber of Public Accountants (WPK)). The results indicate that clients working with engagement partners that are also certified tax consultants feature significantly higher current effective tax rates and higher cash effective tax rates, but no association with the effective tax rate. The study's results propose that clients which have tax certified individual auditors do within their reporting not defer current tax expenses and cash taxes payable to future periods. Further tests reveal that providing tax confirmation services moderates the association of tax certified individual auditors with effective tax rates.

This study contributes in identifying individual auditors as being another determinant explaining the 'undersheltering puzzle'. Results are consistent with engaging tax certified individual auditors in combination with client-specific knowledge spillovers does make a difference for reported levels of effective tax rates. Moreover, the study's evidence proposes that being a chartered tax consultant is relevant also in the context of other professions which are related to tax issues but not related to the provision of tax planning services.

However, this study is subject to several limitations. First, it is possible that the measure of tax certification captures unobservable differences of auditors' psychological cognitive base and values and unobservable selection choices by clients which cannot be fully controlled for by entropy balancing. Individual (non) tax consultants might select into specific audit firms or auditor career stages that might be associated with the results found as well as the unobservable characteristics for their decision to become chartered tax consultants. A tax certification is for sure only one of far more personal qualifications which affect individual auditors' perceptions of situations and values influencing their strategic choices which can

¹⁷ Furthermore, I test whether effective tax rates are capturing some kind of income smoothing. To measure income smoothing, the change of total accruals and the change of operating cash flows are correlated against each other per firm (Wagenhofer and Dücker 2007). Lower values of the resulting variable show higher levels of income smoothing. The correlations of all observed effective tax rates and the measure of income smoothing reveal that reported effective tax rates are not consistently correlated with income smoothing in the supposed direction, so income smoothing is not an issue.

due to data restrictions not be controlled for in this study (Hambrick and Mason 1984). Additionally, very few of the control variables in the regression models are significant and some control variables show opposite directions in comparison to results revealed by prior U.S. studies. This might indicate differences of corporate tax law and influential factors on effective tax rates by German companies leading to restricted transferability of the results but leaves avenues for more evidence. Further, the common relatively low explanatory power indicates that much of the variation of effective tax rates is unexplained.

In spite of these limitations, the findings of this paper provide new insights into the role of individual auditors both for academics and practitioners and emphasize the importance of regarding individual auditors as an additional party to corporate tax reporting. Despite missing causal explorations, this study helps individual auditors, audit firms, and audit clients to understand another determinant of auditing for corporate tax reporting outcomes. Future research should consider further individual auditor characteristics being a determinant for explaining the variation of corporate effective tax rates. Concerning investors, however, it remains an open question how investors, as rational decision-makers perceive the association between tax certified individual auditors and effective tax rates. Since companies which are hiring tax certified individual auditors seem to face higher tax burdens, it is unclear whether companies leave strategically money on the table to possibly lower tax risks and reputational risks and whether their choice is in line with investors' aspiration.

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Appendix

Variable	Definition
Dependent variables for <i>Rate</i> , $\Delta\epsilon_{Rate}$, and <i>RateGAAP</i>	
<i>ETR</i>	Effective tax rate, defined as total tax expense divided by pre-tax book income. <i>ETRs</i> with negative denominators are deleted. The remaining non-missing <i>ETRs</i> are winsorized (reset) so that the largest observation is equal to 1 and the smallest is equal to 0.
<i>CurrETR</i>	Current effective tax rate, defined as current tax expense divided by pre-tax book income. <i>CurrETRs</i> with negative denominators are deleted. The remaining non-missing <i>CurrETRs</i> are winsorized (reset) so that the largest observation is equal to 1 and the smallest is equal to 0.
<i>CashETR</i>	Cash effective tax rate, defined as cash taxes paid divided by pre-tax book income. <i>CashETRs</i> with negative denominators are deleted. The remaining non-missing <i>CashETRs</i> are winsorized (reset) so that the largest observation is equal to 1 and the smallest is equal to 0. If the firm does not disclose cash taxes paid the numerator is replaced by current tax expense (Hanlon and Slemrod 2009; Lassila et al. 2010).
$\Delta\epsilon_{ETR}$	Change in residuals of effective tax rates after the following regression for the entropy balanced sample: $ETR = \beta_0 + \beta_1 R\&D + \beta_2 Size + \beta_3 Lev + \beta_4 PPE + \beta_5 Cash + \beta_6 ROA + \beta_7 NOLCF + \beta_8 Intang + \beta_9 Acc + \beta_{10} Export + \beta_{11} Inv + \beta_{12} Big4 + \beta_{13} OverallExpert + \beta_{14} TaxExpert + \beta_{15} Experience + \beta_{16} Taxfee + \beta_i \sum Firm + \beta_i \sum Year + \epsilon_{ETR}$
$\Delta\epsilon_{CurrETR}$	Change in residuals of current effective tax rates after the following regression for the entropy balanced sample: $CurrETR = \beta_0 + \beta_1 R\&D + \beta_2 Size + \beta_3 Lev + \beta_4 PPE + \beta_5 Cash + \beta_6 ROA + \beta_7 NOLCF + \beta_8 Intang + \beta_9 Acc + \beta_{10} Export + \beta_{11} Inv + \beta_{12} Big4 + \beta_{13} OverallExpert + \beta_{14} TaxExpert + \beta_{15} Experience + \beta_{16} Taxfee + \beta_i \sum Firm + \beta_i \sum Year + \epsilon_{CurrETR}$
$\Delta\epsilon_{CashETR}$	Change in residuals of cash effective tax rates after the following regression for the entropy balanced sample: $CashETR = \beta_0 + \beta_1 R\&D + \beta_2 Size + \beta_3 Lev + \beta_4 PPE + \beta_5 Cash + \beta_6 ROA + \beta_7 NOLCF + \beta_8 Intang + \beta_9 Acc + \beta_{10} Export + \beta_{11} Inv + \beta_{12} Big4 + \beta_{13} OverallExpert + \beta_{14} TaxExpert + \beta_{15} Experience + \beta_{16} Taxfee + \beta_i \sum Firm + \beta_i \sum Year + \epsilon_{CashETR}$
<i>ETRGAAP</i>	Effective tax rate according to German GAAP, defined as total tax expense divided by pre-tax book income of the individual financial statements according to German GAAP. <i>ETRGAAPs</i> with negative denominators are deleted. The remaining non-missing <i>ETRGAAPs</i> are winsorized (reset) so that the largest observation is equal to 1 and the smallest is equal to 0.
<i>CurrETRGAAP</i>	Current effective tax rate according to German GAAP, defined as current tax expense divided by pre-tax book income of the individual financial statements according to German GAAP. <i>CurrETRGAAPs</i> with negative denominators are deleted. The remaining non-missing <i>CurrETRGAAPs</i> are winsorized (reset) so that the largest observation is equal to 1 and the smallest is equal to 0.

continued

Variable	Definition
Variable of interest	
<i>StB</i>	Indicator variable equal to 1 if the signing engagement partner is a chartered tax consultant; 0 otherwise.
<i>StBChange</i>	Indicator variable equal to 1 if a company changes from a non-tax certified individual auditor to a tax certified individual auditor; 0 if a company changes from a tax certified individual auditor to a non-tax certified individual auditor.
Control variables	
<i>R&D</i>	Research and development expense for year t scaled by total assets
<i>Dep</i>	Depreciation and amortization expense for year t divided by total assets
<i>Size</i>	The natural logarithm of total assets at the end of year t
<i>Lev</i>	Debt-to-equity ratio at the end of year t
<i>PPE</i>	Net property, plant and equipment for year t scaled by total assets
<i>Cash</i>	Cash holdings at the end of year t divided by total assets
<i>ROA</i>	Return on assets for year t , measured as the ratio of income before taxes scaled by total assets
<i>NOLCF</i>	Indicator variable equal to 1 if there is a loss carryforward at the end of year t ; 0 otherwise
<i>Export</i>	Foreign sales for year t scaled by total assets
<i>Inv</i>	Inventories for year t scaled by total assets
<i>Intang</i>	Intangible assets for year t scaled by total assets
<i>Acc</i>	Total accruals defined as net income before extraordinary items less operating cash flow for year t scaled by total assets
<i>Big4</i>	Indicator variable equal to 1 if audited by a Big 4 firm; 0 otherwise
<i>OverallExpert</i>	Indicator variable equal to 1 if an audit firm is an overall expert; 0 otherwise. Overall expertise is defined as a total fee market share in a given city ^a and industry (two-digit GICS) market that is greater than or equal to 30% following Neal and Riley (2004). Market share is defined as total fees paid to the audit firm divided by total fees paid to all other audit firms in the same industry and city
<i>TaxExpert</i>	Indicator variable equal to 1 if an audit firm is a tax expert; 0 otherwise. Tax expertise is defined as a tax service market share in a given city and industry (two-digit GICS) market that is greater than or equal to 30% following Neal and Riley (2004). Market share is defined as total tax fees paid to the audit firm divided by total tax fees paid to all other audit firms in the same industry and city
<i>Experience</i>	The natural logarithm of the number of years of experience of the signing engagement partner since the certification date
<i>Taxfee</i>	Tax fees paid to the auditor relative to total fees paid
<i>TaxfeeDummy</i>	Indicator variable equal to 1 if the incumbent audit firm provides tax confirmation services in year t ; 0 otherwise
<i>IRStrength</i>	Enforcement strength, defined as a score for each local German tax authority based on a survey conducted by Klimasch and Prudent (2005)
<i>DummyForeignTax</i>	Indicator variable equal to 1 if current foreign income taxes for year t are greater than 0; 0 otherwise

continued

Variable	Definition
<i>ForeignTax</i>	Current foreign income taxes for year t divided by total assets
<i>CapitalIntensity</i>	Sales divided by net property, plant and equipment of year t
<i>AudIndep</i>	Total non-audit fees minus tax fees paid to the auditor relative to total fees paid
<i>Tenure</i>	Number of years the firm has been audited by the same audit firm
<i>LNAF</i>	The natural logarithm of audit fees paid to the auditor
<i>AuditfirmChange</i>	Indicator variable equal to 1 if the audit firm changed in year t ; 0 otherwise
<i>Gender</i>	Indicator variable equal to 1 if the individual auditor is female; 0 otherwise
<i>PhD</i>	Indicator variable equal to 1 if the individual auditor holds a PhD title; 0 otherwise
<i>SizeGAAP</i>	The natural logarithm of total assets of the individual financial statements according to German GAAP at the end of year t
<i>LevGAAP</i>	Debt-to-equity ratio of the individual financial statements according to German GAAP at the end of year t
<i>PPEGAAP</i>	Net property, plant and equipment of the individual financial statements according to German GAAP for year t scaled by total assets
<i>CashGAAP</i>	Cash holdings of the individual financial statements according to German GAAP at the end of year t divided by total assets
<i>ROAGAAP</i>	Return on assets of the individual financial statements according to German GAAP for year t , measured as the ratio of income before taxes scaled by total assets
<i>NOLCFGAAP</i>	Indicator variable equal to 1 if there is a loss carryforward in the individual financial statements according to German GAAP at the end of year t ; 0 otherwise
<i>ExportGAAP</i>	Foreign sales of the individual financial statements according to German GAAP for year t scaled by total assets
<i>InvGAAP</i>	Inventories of the individual financial statements according to German GAAP for year t scaled by total assets
<i>IntangGAAP</i>	Intangible assets of the individual financial statements according to German GAAP for year t scaled by total assets
<i>AccGAAP</i>	Total accruals defined as net income before extraordinary items less operating cash flow of the individual financial statements according to German GAAP for year t scaled by total assets
<i>CapitalIntensityGAAP</i>	Sales divided by net property, plant and equipment of the individual financial statements according to German GAAP of year t
<i>Firm</i>	Firm indicator variables equal to 1 for each enterprise; 0 otherwise
<i>Year</i>	Year indicator variables equal to 1 for each year; 0 otherwise
<i>Controls</i>	Control variables mentioned in regression Eq. (1)

^a Only those German cities are included here which constitute clearly defined city audit markets with the presence of at least three of the Big 4 audit firms (Deloitte, EY, KPMG, PwC). Additionally, Eschborn is added to Frankfurt, because this is the Frankfurt office of EY. Leonberg is added to Stuttgart, because it is the Stuttgart location of BDO. Both cities are just about 15 km away from the respective main city

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