Big 4 Affiliation, Tax Expertise, and the Art of Avoiding Taxes: Do the Big 4 Practice what they Preach?

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Abstract

Using a unique private firm dataset from 13 European countries, we investigate Big 4's *own* tax planning relative to that of their peers. While prior research suggests that Big 4 private firm auditees avoid more taxes, we show that Big 4 affiliated firms, which are private firms themselves, are associated with *lower* levels of non-conforming tax avoidance relative to their peers. However, we further find evidence of a positive relation between Big 4 affiliation and income shifting. The negative (positive) relation between Big 4 affiliation and non-conforming tax avoidance (income shifting) is *reversed* in countries with less strict institutional environments and lower book-tax conformity levels, where the Big 4 are less likely to be scrutinized by regulators. We argue that income shifting and non-conforming tax avoidance are associated with different tax and non-tax trade-offs for the Big 4 relative to the non-Big 4. The Big 4 avoid *more* taxes in low tax rate countries, which are more likely to serve as inbound income shifting locations. We contribute to the literature by documenting how political and reputational costs interact with tax expertise to define Big 4's *own* tax planning rather than merely that of their clients.

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1. Introduction

Audit research generally concludes that Big 4 accounting firms are characterized by superior tax expertise, which they pass on to their clients either through their audit or their dedicated tax services. Yet not much is known as to whether the Big 4 utilize their tax expertise in their own tax planning decisions. This observation is important particularly in the light of the numerous tax scandals in which all Big 4 accounting firms have been involved since their inception. For example, in the wake of the "Luxembourg Leaks" scandal in late 2014, members of the UK parliament accused PwC of "selling tax avoidance on an industrial scale".[1] They additionally argued that "Deloitte, E&Y, KPMG, and PwC who provided the (UK) government with expert accountants to draw up tax laws, went on to advise multinationals and individuals on how to exploit loopholes around legislation they had helped to write".[2] The potential role of Big 4 accounting firms in facilitating the transfer of resources from the state to them or their clients seems to be at odds with their primary objective; that is, the provision of high quality audits. This is because delivering high quality audits is, in a sense, a public good. Yet, audit research suggests that not only do Big 4 accounting firms deliver superior audit quality, but they also *restrict* tax avoidance in public firms (DeAngelo 1981; Khurana and Raman 2004; Francis and Wang 2008; Weber and Willenborg 2008; Skinner and Srinivasan 2012; Kanagaretnam et al. 2016). Big 4 accounting firms arguably have strong incentives to deliver superior audit quality and restrict tax avoidance in public firms because of their great wealth at risk and large reputation capital

[1] https://www.ft.com/content/d2a73216-7f0a-11e4-a828-00144feabdc0
[2] https://www.theguardian.com/business/2013/apr/26/accountancy-firms-knowledge-treasury-avoid-tax

(DeAngelo 1981; Francis and Wang 2008). However, recent evidence suggests that Big 4 auditors utilize their tax expertise and emphasize tax planning for their private firm clients (Chen et al. 2017). This observation is important because companies that belong to the Big 4 group of companies as well as their industry peers are private firm themselves. Therefore, it is not ex-ante clear how Big 4's political and reputational costs, as well as their tax expertise jointly affect Big 4's *own* corporate decisions.

In this study, we examine the tax planning behavior of taxable entities that belong to the Big 4 group of companies and engage in accounting, auditing, and tax-consultancy activities and compare it with that of their industry peers. To this end, we utilize a unique European private firm dataset to provide evidence on *whether* and *how* tax expertise (tax competency argument) or Big 4's increased public scrutiny and incentives to protect their reputational capital (political and reputational costs argument) interact with each other in determining tax outcomes. To our knowledge, this is the first study to examine to what extent political costs and reputational considerations as well as tax expertise have an effect on Big 4's *own* corporate decisions rather than merely on the quality and the type of services they deliver to their clients.

We base our analysis on two commonly used tax planning practices: non-conforming tax avoidance and tax-motivated income shifting. Because non-conforming tax avoidance is relatively easy to capture empirically, prior research has extensively investigated the degree to which firms engage in this particular type of tax avoidance. In addition to non-conforming tax avoidance, we focus on tax-motivated income shifting for two main reasons: *First*, Big 4 firms are multinational networks of companies. Their organizational structure therefore favors the implementation of income shifting strategies that may be tax-motivated. This observation is important, because our purpose is to capture Big 4's *overall* tax planning strategy and compare it

to that of their peers. That is, examine how the Big 4 and their peers optimize their tax planning by combining different tax planning strategies.[3,4] *Second*, we purport that income shifting is a tax planning strategy that requires a significant degree of tax expertise to implement. We argue this because the implementation of income shifting strategies requires good knowledge of the international institutional environment and the pricing of intangible goods, services or rights to exploit intellectual property, whose market values may be difficult to observe and estimate. However, precisely because market prices for intercompany transactions can be difficult to observe, firms have flexibility to choose the most tax-favored price within the range of acceptable (or well-supported) prices (De Simone, Klassen, et al. 2017). Tax experts might be better able to utilize or exploit income shifting's inherent flexibility to their own discretion so that they choose the most tax-favored price without increasing the risk of having their tax positions challenged by tax authorities. Because we are interested in examining the tax planning behavior among a group of tax experts with varying degrees of tax expertise (i.e., the Big 4 are typically considered to have superior tax expertise relative to their peers), income shifting naturally arises as a suitable tax planning strategy to examine the link between tax expertise and tax planning choices.

There are three alternative scenarios regarding the effect that political and/or reputational costs as well as tax expertise have on Big 4's own tax planning decisions. Under the first scenario, political and reputational costs (i.e., the non-tax costs of tax avoidance) dominate Big 4's incentives to utilize their superior tax expertise. The Big 4 arguably have greater reputational

[3] Sole reliance on non-conforming tax avoidance may not be sufficient to draw safe conclusions as to whether firms *generally* engage in more or less tax avoidance because firms may engage in non-conforming and conforming tax avoidance to varying degrees, conditional on the setting (Hanlon and Heitzman 2010). For example Badertscher et al. (2017) argue that, in certain settings, non-conforming and conforming tax avoidance may act as substitutes.

[4] Badertscher et al. (2017) argue that prior research that examines the extent to which firms engage in income shifting assumes that firms shift income and losses in a book-tax conforming manner. From that perspective, tax-motivated outbound income shifting can be considered as a form of conforming tax avoidance.

capital than their peers and prior research suggests that damage to firm reputation is a potential consequence of tax avoidance (Graham et al. 2014; Dyreng and Markle 2016; Austin and Wilson 2017). Therefore, based on the "reputational cost" hypothesis the Big 4 could engage in less tax avoidance compared to peer firms to protect their international reputations.[5] One might also argue that Big 4 firms are more likely to be scrutinized by regulators due to Big 4's large size and market share in the audit market. It is therefore likely that, because the Big 4 are so closely monitored, they are also likely to engage in less tax avoidance compared to industry peers, consistent with the "political costs" hypothesis (Watts and Zimmerman 1978; Zimmerman 1983). Furthermore, because Big 4 affiliated firms are more visible than peer firms and more likely to be scrutinized by the public, Big 4 tax specialists probably also have considerably stronger personal reputational considerations than non-Big 4 tax specialists. Therefore, based on this first scenario, one would expect to find a negative relation between Big 4 affiliation and tax avoidance. [6]

Under the second scenario, Big 4's incentives to utilize their superior tax expertise outweigh the non-tax costs of tax avoidance. Because litigation risk is generally low in private firms (Chaney et al. 2004; Hope and Langli 2010) and Big 4 affiliates are private firms themselves, one could argue that Big 4's litigation considerations are not particularly high. To the extent that Big 4's political costs and reputation considerations are a function of their litigation considerations, it follows that Big 4's expected political and/or reputational costs from

[5] This argument is also consistent with Austin and Wilson (2017) who argue that firms with valuable brands engage in less tax avoidance because they have stronger reputation considerations.

[6] We use the terms "Big 4 affiliated firms", "Big 4 associated firms", or "the Big 4" interchangeably throughout the paper to refer to entities that belong to the Big 4 network of companies. These entities may or may not be minority or majority owned by other firms of the network. Therefore, the term "Big 4 affiliation" is used to mean membership in a group of companies and, unless explicitly stated otherwise, does not necessarily imply ownership relation. Because our purpose is to examine that tax planning practices among tax experts, to ensure better comparability between treated and control samples, our empirical analysis is based on those Big 4 affiliated firms that engage in accounting, auditing, and tax consultancy activities.

engaging in tax avoidance themselves may be relatively low. Because the Big 4 possess superior tax expertise, they are also probably better able to maximize their tax benefits compared to their peers. One could therefore argue that, in the low litigation private firm environment, Big 4's own tax incentives dwarf their reputation considerations. Under this scenario, one would therefore expect to find a positive relation between Big 4 affiliation and tax avoidance.

While these two scenarios are plausible, we believe that they are less likely than a third scenario; that is, that the Big 4 optimize their tax planning while taking actions to protect their reputation capital. We purport that non-conforming tax avoidance and income shifting expose Big 4 affiliates to different levels of reputational risk and/or political costs because a) non-conforming tax avoidance is generally easier to track and to benchmark against industry peers even in the absence of in-depth tax-specific expertise, and b) conditional on aggressive tax planning being detected, income shifting is harder to challenge from a regulator's perspective. We further purport that the tax benefits from implementing non-conforming tax avoidance are probably not uniform across all settings but vary in the cross-section with certain firm-specific and country specific factors, such as pre-tax profitability and the level of country-specific statutory tax rates. Furthermore, income shifting is likely easier and less costly to implement for the Big 4 than for peer firms due to Big 4's tax expertise and extended geographic presence. Because the Big 4 have superior tax expertise and arguably larger reputational capital than their peers, they might be more likely to employ a combination of income shifting and non-conforming tax avoidance after weighting the relative benefits and costs assigned to each alternative tax planning strategy. By doing so, they are probably better able to optimize their tax planning without formally failing to adhere to the prevailing institutional and regulatory framework and without putting their reputational capital at risk. This, however, also implies a

possible substitution effect between income shifting and non-conforming tax avoidance for the Big 4, depending on the setting. This argument is consistent with Atwood et al. (2012) and Badertscher et al. (2017), who purport that, under certain conditions, non-conforming and conforming tax avoidance may act as substitutes.

We start by examining the relation between Big 4 affiliation and non-conforming tax avoidance. Using a sample of 11,689 firms that engage in accounting, auditing, and tax consultancy activities from 13 European countries over the period 2009 to 2013, we find that Big 4 affiliated firms are associated with higher levels of GAAP effective tax rates (ETRs) compared to their industry peers. In terms of economic significance of our findings, our regression estimates suggest that Big 4 affiliation results in an approximately 3.4 percentage point increase in a firm's three-year GAAP ETR. These findings are consistent with the political and reputational costs of engaging non-conforming tax avoidance outweighing the benefits of having greater tax expertise for Big 4 associated firms.

In a second step, we consider the moderating effects of the institutional environment and country-level book-tax conformity on the relation between Big 4 affiliation and non-conforming tax avoidance. We find that Big 4 affiliation is related with *more* tax avoidance when legal institutions are weak and when the country level book-tax conformity is low, consistent with the political costs of engaging in non-conforming tax avoidance being higher for the Big 4 *only* in countries with stronger legal institutions and higher book-tax conformity.

We next turn to our analysis of the relation between Big 4 affiliation and income shifting. To this end, we limit our control sample to those non-Big 4 firms that have foreign majority-owned affiliates. We find results consistent with original findings on this reduced sample. In particular, we continue to find a negative relation between Big 4 affiliation and non-conforming

tax avoidance. Furthermore, we find that the negative relation between Big 4 affiliation and non-conforming tax avoidance is reversed in countries with weak legal institutions and low book-tax conformity levels. However, we also find a significantly negative relation between statutory tax rates and return on assets or return on sales only for the Big 4. We further show that this relation weakens significantly for loss-making affiliates. These findings are consistent with the argument that the Big 4 shift income out of high tax rate affiliates. They additionally suggest that incentives to shift income out of high-tax affiliates weaken when these affiliates are not profitable in line with prior research (De Simone, Klassen, et al. 2017).

We proceed with examining the moderating role of scrutiny by regulatory authorities on the relation between Big 4 affiliation and income shifting. We find that Big 4 affiliates engage in more income shifting in countries with stronger legal institutions and higher book-tax conformity levels. That is, in the precise context in which the Big 4 are restricted from engaging in non-conforming tax avoidance. These findings therefore imply that, when the Big 4 are restricted from engaging in non-conforming tax avoidance, they may substitute income shifting for non-conforming tax avoidance.

We further explore the degree to which the Big 4 engage in more non-conforming tax avoidance in those countries that are likely to serve as inbound income shifting locations. We provide evidence that the negative relation between Big 4 affiliation and non-conforming tax avoidance is *reversed* in countries with lower statutory tax rates. That is, in the precise context in which the Big 4 are likely to receive the income shifted from foreign affiliates, the Big 4 engage in *more* non-conforming tax avoidance compared to their peers.

Finally, in supplemental analysis we examine Big 4 incentives to engage in higher levels of non-conforming tax avoidance compared to their peers. We provide evidence that the negative

relation between Big 4 affiliation and non-conforming tax avoidance is weakened for higher levels of pre-tax profitability; that is, when the benefits of non-conforming tax avoidance are greater. We further show that the negative link between Big 4 affiliation and non-conforming tax avoidance is also weakened when a Big 4 firm is audited by a Big 4 auditor, consistent with the argument that tax-related considerations partly drive the demand for a Big 4 auditor in the private firm market.

Our results contribute to the growing literatures on the determinants of tax avoidance (Hanlon and Heitzman 2010). While much of the tax avoidance literature explores reasons why firms avoid more taxes, we provide evidence that political costs and reputational considerations are important determinants of the tax planning decisions among Big 4 affiliates in Europe, which are likely subject to more scrutiny for their tax practices than peer firms. These findings also suggest that Big 4 affiliates trade-off the benefits with the non-tax costs of tax avoidance, and that, at least in our setting, non-tax costs dominate in determining non-conforming tax avoidance. Our study therefore additionally contributes to prior research investigating the importance of political costs and reputational considerations in determining firms' tax planning strategies (Hanlon and Slemrod 2009; Graham and Hanlon 2013; Gallemore et al. 2014; Austin and Wilson 2017; Zimmerman 1983).

Furthermore, by providing evidence that Big 4 affiliated firms shift more income out of high tax rate affiliates compared to their peers, our study is relevant to the stream of research that examines the importance of tax-motivated income shifting (De Simone, Klassen, et al. 2017; De Simone, Mills, et al. 2017; De Simone 2016; Badertscher et al. 2017; Markle 2016; Gramlich et al. 2004; Dyreng and Markle 2016; Dharmapala and Riedel 2013; Klassen et al. 1993; Jacob 1996; Collins et al. 1998; Klassen and Laplante 2012; Beuselinck et al. 2015). While Beuselinck

et al. (2015) argue firms shift more income out of countries with weak legal enforcement, we provide evidence that the opposite is true for the Big 4. We purport that this is the case because the Big 4 a) are more likely to be restricted from engaging in non-conforming tax avoidance in more strict institutional environments, and b) have superior tax expertise, thus being better able to engage in income shifting (which, by nature, is harder to successfully challenge) relative to peer firms when subjected to strong regulatory scrutiny without failing to comply with the letter of the prevailing regulatory standards.

Our study is additionally relevant to the stream of research that investigates the importance of individual manager characteristics in defining tax outcomes (Dyreng et al. 2010; Brown and Drake 2014; Koester et al. 2016; Jiang et al. 2017). Until now, prior literature has been unable to document the extent to which tax expertise within the firm affects tax outcomes.[7] We argue that the Big 4 utilize their in-house tax expertise to optimize their tax planning strategy while taking into account the tax and non-tax trade-offs associated with each alternative tax planning strategy. We additionally provide evidence that, depending on the setting, the Big 4 might substitute income shifting for non-conforming tax avoidance, and vice-versa. Our study is therefore in line with Atwood et al. (2012) and Badertscher et al. (2017) who argue that, under certain conditions, conforming and non-conforming tax avoidance may act as substitutes.

Finally, by providing evidence that the negative relation between Big 4 affiliation and tax avoidance is weakened when a Big 4 affiliated firm is audited by a Big 4 auditor, the current study is relevant to the stream of research that examines the importance of auditing in private firms (Chaney et al. 2004; Hope and Langli 2010; Hope et al. 2012; Vanstraelen and Schelleman 2017; Chen et al. 2017). From this perspective, our study further contributes to the stream of

[7] For example, Dyreng et al. 2010 find no evidence that having an MBA, a Juris Doctor, or an accounting degree is associated with higher propensity to engage in tax avoidance.

literature that investigates the interplay between auditing and tax and the role of auditors as tax experts (Kinney et al. 2004; McGuire et al. 2012; Christensen et al. 2015; De Simone et al. 2015; Lennox 2016; Klassen et al. 2016; Chen et al. 2017)

The remainder of the paper is organized as follows. Section 2 presents information on the organizational structure of Big 4 associated firms. Section 3 describes the related prior literature and develops the hypotheses. In section 4, the empirical research designed is detailed. Section 5 presents and discusses the data, descriptive statistics, and correlations. The empirical findings are discussed in section 6. Section 7 concludes.

2. Big 4 Organizational Structure

Firms that belong to the Big 4 network usually (but not necessarily always[8]) operate under the international trademark of the respective group (PwC, KPMG, Deloitte, or E&Y). Yet none of the Big 4 is a single firm operating as the international parent entity of local (country) subsidiaries. Big 4's legal structure is very similar to that of law firm networks: each firm that belongs to the respective network is owned and managed independently but shares the quality standards applicable to all members of the network. On its global website, PricewaterhouseCoopers explains (See Appendix for more information on how PwC is structured): *"The PwC network is not one international partnership and PwC member firms are not otherwise legal partners with each other. Many of the member firms have legally registered names which contain 'PricewaterhouseCoopers', however there is no ownership by PwCIL (PricewaterhouseCoopers International Limited)"*. The other three large accounting firms make similar statements. For example, on page 13 of its 2015 Global Report, Deloitte states that *"(the*

[8] Big 4 affiliated firms that do not offer services to clients but instead provide supportive services to other firms of the respective network may not always bear the trademark of group of companies in which they belong to (See, for example, Figure 1 for an overview of Big 4's organizational structure in the UK).

member firms) ...are separate and independent firms that are owned and managed locally. These firms have come together to practice under a common brand, methodologies, client service standards, and other professional standards and guidelines. The member firm structure supports compliance with rules of local ownership and management governing the accountancy profession in many countries. It also reflects the fact that the member firms are not subsidiaries or branch offices of a global parent. Rather, they are separate and distinct locally formed legal entities that have voluntarily joined the network to coordinate their approach to client service."

To coordinate their local, independent network members, the Big 4 setup separate legal entities at the regional and/or international level. While some of these entities may also engage in audit- or tax-related activities, their main purpose is to provide coordinating services to member of the network at the regional or even international level.[9] The Big 4 are generally frugal with respect to the exact role of their coordinating entities. On its official website, PwC provides some further clarification information on the role of its international coordinating entity, PricewaterhouseCoopers International Limited (PwCIL), which is incorporated in the UK: "*Member firms of PwCIL can use the PwC name and draw on the resources and methodologies of the PwC network. In addition, member firms may draw upon the resources of other member firms and/or secure the provision of professional services by other member firms and/or other entities. In return, member firms are bound to abide by certain common policies and to maintain the standards of the PwC network as put forward by PwCIL."* Most of Big 4's coordinating entities are incorporated in the UK.

[9] For example, E&Y has setup coordinating entities responsible for three main regions: Americas, EMEIA (Europe, Middle-East, India, and Africa), and Asia-Pacific (No dedicated regional coordinating entity exists for Japan). The E&Y EMEIA and Asia-Pacific coordinating entities are incorporated in Europe and, in particular, in the UK. However, apart from these entities, the UK also hosts two global coordinating entities: the "EYGS LLP" and the "Ey Global Services Limited" (See Figure 1).

Even though the concept of a global parent entity does not exist for the Big 4, at the local (country) level the Big 4 may be structured as parent entities of local subsidiaries. Ultimately, however, all Big 4 entities are partner-owned. For example, on page 13 of its 2015 Global Report Deloitte mentions that *"The partners of Deloitte member firms are generally the sole owners of their respective member firms"* and in its 2015 UK Transparency Report (page 15) PwC states that *"PwC UK is wholly owned by its members, who are commonly referred to as partners."*

Not all companies of the network provide client services that relate to audit or tax. Whereas at the local (country) level the parent entity typically engages in audit and tax activities, its subsidiaries can provide supportive services to the members of the local or international network or offer non audit/tax client services. The industry classifications of these companies are therefore unrelated to tax or audit.[10]

To provide a more detailed overview of Big 4's organizational structure, we focus on the UK and present the organizational charts of Big 4 entities that are incorporated (but do not necessarily operate) in the UK.[11,12] To this end, we retrieve ownership information from Endole Suite, a private firm data provider, which delivers comprehensive financial and ownership information on all companies across the UK. We next cross-check the ownership information

[10] For example, the main task of "PWC Tax Information Reporting Limited", which is incorporated in the UK, is to provide multi-jurisdictional tax reporting software to other members of the network. Its industry classification is described as "Business and domestic software development" (See Figure 1).

[11] For example, Ernst & Young Nederland LLP, Ernst & Young Belastingadviseurs LLP, and Ernst & Young Accountants LLP are incorporated in the UK but operate in the Netherlands.

[12] The Big 4 parent companies in the UK also have subsidiaries that are incorporated outside the UK. For example, Deloitte LLP has subsidiaries in Switzerland and in the United Arab Emirates and KPMG LLP has subsidiaries in the USA, Malta, India, and the Netherlands. These subsidiaries are unrelated to tax or audit and are typically consultancy firms or firms that provide services to the network. In most of the cases, these subsidiaries are incorporated in countries with low disclosure requirements for private firms. Therefore, financial statement information for these subsidiaries is very limited.

found in Endole Suite with the ownership data offered in Amadeus. We present the resulting organizational charts in Figure 1.[13]

3. Related Literature and Hypothesis Development

In the current study we argue that that two competing forces will affect the level of tax avoidance among Big 4 associated firms: tax expertise (tax competency argument) and political/reputational costs (political/reputational costs argument). Big 4 firms have considerable tax expertise and McGuire et al. (2012) find that audit clients who purchase tax services from their tax expert audit firm avoid more taxes than other firms. These findings suggest that tax expertise combined with a considerable knowledge of firm operations allow firms to avoid more taxes. Klassen et al. (2016) find that firms whose tax return is signed by an external auditor take more aggressive tax positions, consistent with the findings in McGuire et al. (2012) that knowledge spillover between audit and tax services leads firms to avoid more taxes. Furthermore, Chen et al. (2017) argue that Big 4 auditors emphasize tax planning in private firms, where client demand is more weighted towards optimal tax planning than towards audit quality and litigation risk is low. Since Big 4 affiliates are private firm themselves, one could argue that the Big 4 might also utilize their tax expertise to optimize not only their clients' tax planning but also their own. Based on the tax competency argument one would therefore predict a positive relation between Big 4 affiliation and tax avoidance.

On the other hand, there are reasons as to why Big 4 associated firms might engage in less tax avoidance compared to their peers. Due to Big 4's large size, visibility, and significant

[13] The organizational charts presented in Figure 1 provide a general overview of Big 4's organizational charts in the UK and include -among others- all Big 4 associated companies that engage in auditing and tax-related activities (firms shaded in green). However, the number of subsidiaries that engage in non-audit services or deliver network services is very large. Because the inclusion of all these subsidiaries would result in very large organizational charts, the list of those specific subsidiary undertakings as presented in Figure 1 is not exhaustive.

market share in the audit market, Big 4 associated firms could be more likely to be scrutinized by regulatory authorities and the public. This argument is consistent with the "political costs" hypothesis, which posits that large firms are more likely to be scrutinized by regulators (Watts and Zimmerman 1978) and they therefore avoid less taxes (Zimmerman 1983).[14] Furthermore, it is likely that the Big 4 are subject to greater scrutiny for their own tax planning strategies precisely because their tax expertise and their role in developing and selling tax services makes it easier for them to engage in tax avoidance practices. To the extent that the Big 4 are indeed more likely to be scrutinized by regulatory authorities, they could also engage in less in tax avoidance.

In addition, Big 4's reputational capital relates strongly to the provision of high quality audit and tax services (Francis and Wang 2008; Weber and Willenborg 2008; Chen et al. 2017). However, if a Big 4 associated firm that offers audit or tax advisory services to clients is found to avoid taxes too aggressively in its own accounts, that firm's ability to attract clients could be impaired. The revelation that a Big 4 associated firm engages in tax avoidance in its own accounts could raise considerations that it promotes the same dubious tax planning schemes to its clientele. This could intensify regulatory scrutiny on its clients and potentially result in reputational losses for them as well if they are found to have engaged in aggressive tax planning. The involvement of a Big 4 accounting firm in a tax scandal could lower its audit quality-related reputational capital as well if it raises concerns that the involved accounting firm overemphasizes tax planning in the services it offers to its clients, thus placing lower weigh on audit quality.[15,16] Therefore, the tax planning practices of Big 4 associated firms that engage in auditing and/or tax

[14] Using a sample of firms that engage in accounting, auditing, and tax consultancy activities we report mean (median) values of total assets for the Big 4 that are 7.18 (15.7) times greater than those of their peers for the period 2009-2013.

[15] Consistent with this argument, prior literature suggests that emphasizing tax planning could come at the cost of audit quality (Chen et al. 2017), since it is difficult to defer taxable income without deferring financial statement income (Guenther et al. 1997).

[16] Alternatively, one could further argue that an audit firm that emphasizes tax planning rather than audit quality may be more likely to compromise its independence in order to promote its tax services.

consultancy activities could affect their ability to sell not merely their tax services but their audit services as well if they are found to avoid taxes in an aggressive manner.[17] These considerations are probably much stronger for the Big 4 because their reputational capital is arguably much larger than that of their peers (DeAngelo 1981). Therefore, a Big 4 associated firm is likely to suffer greater reputational losses if it is found to avoid taxes.[18]

We further argue that the high degree of identifiability and visibility of the Big 4 magnifies the personal reputation considerations of the involved partners as well. This is because their own identity, details of their alleged involvement in aggressive tax planning practices, as well as the penalties incurred to them are more likely to be publicized in the media as a result of the public attention that their company's brand name attracts.[19,20] This means that the potential

[17] One could argue that even if a Big 4 associated firm is found by tax authorities to avoid taxes in an aggressive manner, this event is less likely to become known to the wider public because Big 4 associated firms are private firms and, on average, private firms are less scrutinized by the press. We argue, however, that this is unlikely to be the case for Big 4 associated firms due to their great visibility and very strong international brand name. This latter argument is consistent with Austin and Wilson (2017) who argue that firms with valuable consumer-based brand equity (such as the one that the Big 4 have) are more likely to be named for their tax practices by the financial press, protests, the work of advocacy groups, social movement organizations, and other NGO's. They explain that consumer familiarity with the brand puts firms at greater risk for scrutiny for their practices. Austin and Wilson (2017) conclude that, because firms with valuable brands are so closely monitored, they are willing to forgo tax avoidance that may attract negative publicity.

[18] It is also worth noting that, because Big 4 associated firms -particularly those that deliver services to clients- operate under the international trademark of the group of companies they belong to, the reputational losses associated with a Big 4 associated firm avoiding taxes too aggressively are probably not restricted to that particular firm. Instead, they most likely extend to the international brand name under which the involved Big 4 associated firm operates. This, however, greatly magnifies the reputation considerations of Big 4 associated firms, particularly when considering a) the increased media attention that Big 4's actions typically attract, and b) the fact that brand equity is particularly fragile because it is based on consumers' beliefs that can be prone to large and sudden shifts (Dawar and Pillutla 2000; Austin and Wilson 2017).

[19] Notable examples include the involvement of four E&Y senior tax partners in the promotion of abusive tax shelters to rich individuals during the period 1999 to 2004, as well as the 2015 KPMG Belfast tax scandal in which four highly-ranked tax and audit partners were arrested under allegations of tax evasion for their own personal accounts. In both cases, the identities of the involved partners where publicized and details of their misconduct garnered significant media attention.

[20] The KPMG Belfast tax scandal offers a fine example of how important protecting Big 4's reputational capital from tax avoidance allegations is and how the Big 4 take actions to eliminate concerns that aggressive tax planning may have been implemented in their own tax accounts or those of their clients: In late 2015, four highly-ranked tax and audit partners of the KPMG Belfast office were arrested under allegations of tax evasion. Following the incident, KPMG Belfast placed the involved partners in administrative leave and subsequently obliged them to retire, even though the allegations concerned their own tax accounts and not those of their clients or of the audit office in which they were employed and KPMG made an explicit statement in order to clarify this. This example demonstrates that Big 4's partners have particularly heightened reputation considerations that extend even to their

personal reputational losses of engaging in aggressive tax planning are probably stronger for Big 4 tax specialist than for non-Big 4 tax specialists. Therefore, based on the political/reputational costs line of argumentation one would expect to find a negative relation between Big 4 affiliation and tax avoidance.

While it is possible that political and reputational costs dominate Big 4's tax planning decisions at the expense of incentives to engage in tax avoidance or vice-versa, we argue that there is a third, more plausible scenario: that the Big 4 utilize their tax expertise in such a way so that they maximize their tax benefits, while taking actions to protect their reputational capital. In particular, we argue that the Big 4 arguably have much better knowledge of the prevailing local and international regulatory framework. Such a superior knowledge of the institutional setting could allow the Big 4 to maximize their tax savings, without necessarily failing to comply with the letter (but not necessarily the spirit) of the prevailing tax regulations.[21,22]

We further argue that non-conforming tax avoidance and income shifting are associated with different tax and non-tax trade-offs for the Big 4 relative to the non-Big 4. Relatively speaking, income shifting is much harder to identify and accurately estimate compared to non-conforming tax avoidance. By contrast, in its simplest measurable form, non-conforming tax avoidance can by captured by dividing income tax expense or cash taxes paid by pre-tax accounting earnings. This means that aggressive tax planning in the form of non-conforming tax

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own personal tax affairs, much less to the tax planning decisions they take while acting in the course of their employment.

[21] This argument is similar to the "institutional knowledge" argument of Yang (2013) who posits that auditors in China that have better knowledge of the institutional setting may be able to window dress their clients' applications, thus leading to lower client IPO rejection rates. It is additionally similar to the argument of Correia (2014), who purports that advice provided by professionals with knowledge of the regulatory environment could result in lower likelihood of regulatory enforcement and penalties, without necessarily lowering the likelihood of accounting restatements.

[22] We caution that we make no argument that the Big 4 (or their peers) fail to comply to with the letter or the spirit of the prevailing tax regulations. Instead, we argue that compliance with the letter of a standard (by definition) does not necessarily require compliance with the spirit of the standard.

avoidance may, to a certain extent, be directly visible and identifiable even by unsophisticated market participants that lack tax-related expertise. The Big 4 arguably have a much greater reputational capital than their peers. In addition, they are much more visible and more likely to be subject to scrutiny for their actions not merely by regulators, but by their clients, social movement organizations, and the financial press. Because a) non-conforming tax avoidance is probably more directly observable than income shifting and, and b) Big 4's improper tax activities are more likely to be scrutinized but also to have an impact on their ability to sell audit and tax services to clients, we argue that aggressive forms of non-conforming tax avoidance expose the Big 4 relative to the non-Big 4 to much greater reputational risk compared to income shifting.

Furthermore, conditional on aggressive tax planning being detected, income shifting is probably more difficult to successfully challenge.[23] By contrast, large book-tax differences (as a measure of non-conforming tax avoidance) are positively associated with IRS settlements in the US (Mills 1998). We expect that these arguments particularly apply to the Big 4 whose expertise and good knowledge of the international institutional environment could allow them to better defend their tax positions. Big 4's income shifting strategies might be more difficult to challenge, also due to Big 4's significantly more complex organizational structure. The Big 4 do not operate as multinational corporations but instead as global company networks. Therefore, income shifting could effectively take place directly between any of these legally independent entities. It is possible, however, that income shifting tax planning strategies are coordinated at the global or

[23] Lisa De Simone, a leading expert on income shifting explains: "The problem for (US) tax authorities, isn't detecting income shifting; the problem is that it's hard to fight. Auditors can go in and ask to see a company's transfer pricing documentation. But then they have to sift through thousands of pages to figure out which transactions are the most tax-aggressive and which they have the best chance of prevailing on. It takes time. And they're working at a disadvantage: The company almost always has better information about how much its products and assets are worth. Intellectual property, especially, is hard to value and the burden is on the auditors to prove their estimate is better. Some of these disputes go to court, and the IRS has been losing those cases."

regional level by intermediary companies, which, again, may not necessarily act as parent companies of the legal entities whose income is subject to cross-jurisdictional income shifting.[24] Such a type of multiple-layer income shifting scheme, however, most likely makes the accurate estimation and successful challenge of the related tax position more difficult.

In addition, because the Big 4 arguably exhibit significantly greater geographic dispersion than their peers, they are probably better able to maximize their tax benefits through income shifting. One could further argue that, relative to the non-Big 4, the Big 4 also face much lower implementation costs with regards to income shifting because the large scale of their operations could allow them to reduce the associated costs by realizing greater economies of scale. In addition, the ability to maximize their tax savings through income shifting is probably more limited for the non-Big 4 relative to the Big 4 due to their relatively inferior tax expertise and more limited international geographic presence.

Because of the attractive cost-benefit features of income shifting for the Big 4, we expect that it plays a prominent role in Big 4's tax planning strategies. By contrast, we predict that the non-Big 4 might engage in more non-conforming tax avoidance than the Big 4 because non-conforming tax avoidance is probably less complex and less costly to implement than income shifting and the non-Big 4 face lower political costs and have relatively lower reputational considerations. One could further argue that the non-Big 4 might, on average, engage in less income shifting compared to the Big 4 due to their inferior tax expertise and less comprehensive knowledge of the international institutional setting, which could limit their ability to successfully defend their income shifting tax positions when challenged.

Based on these arguments, we state our first two hypotheses in null format as follows:

[24] Such entities could be, for example, Big 4's coordinating entities.

H1a: *There is no difference in the level of non-conforming tax avoidance between Big 4 affiliates and other firms.*

H1b: *There is no difference in the level of income shifting between Big 4 affiliates and other firms.*

To the extent that political and reputation costs are stronger for the Big 4 than for the non-Big 4 and non-conforming tax avoidance exposes the Big 4 to greater political and/or reputation costs than peer firms, one would expect that Big 4 affiliated firms are likely to engage in less non-conforming tax avoidance in countries with more strict institutional environments and high levels of required book-tax conformity where regulatory scrutiny is stronger (Atwood et al. 2012).

With regards to the moderating role of regulatory scrutiny on the relation between Big 4 affiliation and income shifting we make the following two mutually exclusive predictions: *First*, relative to their peers, the Big 4 could engage in less income shifting in countries where they are more likely to be scrutinized by regulatory authorities. Such a scenario would be consistent with the argument that heightened regulatory scrutiny increases the reputation considerations of the Big 4 not merely for tax positions that relate to non-conforming tax avoidance, but for tax positions that relate to income shifting as well. *Second*, relative to their peers, the Big 4 engage in more income shifting when they are more restricted from engaging in non-conforming tax avoidance. Therefore, to the extent that increased regulatory scrutiny restricts the Big 4 from engaging in non-conforming tax avoidance, the Big 4 might be more likely to substitute income shifting for non-conforming tax avoidance as regulatory scrutiny increases. This argument is

consistent with Atwood et al. (2012) and Badertscher et al. (2017) who purport that, under certain conditions, non-conforming and conforming tax avoidance my act as substitutes.[25]

Based on these arguments, we formulate the next four hypotheses in null format as follows:

H2a: *The strictness of the institutional environment does not moderate the relation between Big 4 affiliation and non-conforming tax avoidance.*

H2b: *The level of required book-tax conformity does not moderate the relation between Big 4 affiliation and non-conforming tax avoidance.*

H2c: *The strictness of the institutional environment does not moderate the relation between Big 4 affiliation and income shifting.*

H2d: *The level of required book-tax conformity does not moderate the relation between Big 4 affiliation and income shifting.*

4. Methodology

4.1 Non-Conforming Tax Avoidance Measures

Due to data restrictions, we focus on GAAP ETR measures of non-conforming tax avoidance. Furthermore, because annual ETRs demonstrate considerable variation and may not necessarily be good proxies of tax avoidance, we use instead long-term measures of tax avoidance (Dyreng et al. 2008).[26] Following Atwood et al. (2012) we compute our measures over a period of three years that is adequate to reduce the effect of items that reverse without significantly limiting sample size.

[25] We make no statement that the Big 4 substitute income shifting for non-conforming tax avoidance under all conditions. Instead, we argue that there could be settings in which the Big 4 might be more likely to emphasize income shifting rather than non-conforming tax avoidance and vice-versa and that such a substitution effect could take place for the Big 4 as regulatory scrutiny increases.

[26] Results are very similar when using the annual GAAP ETR.

For our first tax-avoidance measure, we rely on the annual GAAP ETR. We compute the GAAP ETR at the firm-year level as the ratio of book tax expense to pre-tax income. Our first measure is the three-year average of the calculated GAAP ETR, multiplied by -1, so that higher values indicate more tax avoidance:

$$\boldsymbol{MEAS1 = -[\sum_{t-2}^{t}(TAX\_EXP_{i,t}\,/PLBT_{i,t})]\,/3}$$

Our second measure of non-conforming tax avoidance is a variation of the Hanlon and Heitzman (2010) and Atwood et al. (2012) tax avoidance measure. This measure is the three-year sum of the difference between the tax on pre-tax income calculated based on the corresponding country-year statutory tax rate and the income tax expense divided by the sum of the pretax income over the past three years:

$$\boldsymbol{MEAS2 = [\sum_{t-2}^{t}(PLBT\ X\ STR)_{i,t} - \sum_{t-2}^{t} TAX\_EXP_{i,t}]/\sum_{t-2}^{t} PLBT_{i,t}}$$

In line with prior literature (Dyreng et al. 2008; Atwood et al. 2012), we caution that these measures do not necessarily capture improper or illegal activity. Instead we recognize that, to the extent that firms do not engage in improper tax practices, managing tax costs is an important component of a firm's long-term strategy (Atwood et al. 2012).

4.2 Empirical Models

To test H1a, we perform the following OLS regression:

$$\boldsymbol{MEAS = a_0 + a_1 B4 + Controls + Year\ FE + Country\ FE + \varepsilon}\ \ (\mathbf{1}),$$

where *MEAS* is the corresponding measure of non-conforming tax avoidance and *B4* is an indicator variable that takes the value of one if a firm belongs to a Big 4 network, and zero otherwise.

Following prior research (Dyreng et al. 2008; Dyreng et al. 2010; Atwood et al. 2012; Edwards et al. 2016), we include the following firm-specific controls in the regression model: We control for firm size measured as the natural log of total assets *(LNTOAS).* Moreover, we include a control for the amount of leverage *(LVG)*. We define this variable as the ratio of short- and long-term debt to total assets. Our measure of firm profitability is the ratio of operating profit to lagged total assets *(ROA).* In addition, we include an indicator for firms with negative operating profitability *(LOSS)*. Our measure of income volatility is the standard deviation of ROA *(STDROA).* We further control for the percentage change in sales relative to the previous fiscal year *(GROWTH),* the ratio of property plant and equipment to lagged total assets *(PPE)*, the ratio of current assets to current liability *(CURR)*, as well as the ratio of sales to lagged total assets *(ATURN)*. Because our sample includes taxable entities that operate in different legal types, we control for the country-legal type-fiscal year median level of negative ETR *(METR)* to account for potential differences in the way these entities are taxed.[27] Finally, we include country and year fixed effects.

To test H2a and H2b we remove country fixed from regression (1) and include instead the following country-specific control variables: We control for the level of legal enforcement *(ENF).* We define this variable as the mean of the efficiency of the judicial system, rule of law, and corruption index in La Porta et al. (1998). We further control for the level of required book-tax conformity *(BTC)* as estimated in Atwood et al. (2010), as well as for the corresponding

[27] Results are very similar when we control for the mean rather than the median level of country-legal type-fiscal year negative ETR.

country-year statutory tax rate *(STR)*. Moreover, we control for the level of economic development by including the natural logarithm of each country's Gross Domestic Product *(LNGDP)*. In a second step, we interact, in separate specifications, *ENF* and *BTC* with the Big 4 indicator and perform the following OLS regression:

$$\boldsymbol{MEAS = a_0 + a_1 B4 + a_2 B4\ X\ VARIABLE + a_3 VARIABLE + Controls + Year\ FE + \varepsilon} \quad \boldsymbol{(2)},$$

where *VARIABLE* indicates one of the following test variables: *ENF* or *BTC*.

For our income shifting tests we follow Beuselinck et al. (2015) and perform the following regression:

$$\boldsymbol{PROFIT = a_0 + a_1 B4 + a_2 B4\ X\ STR + a_3 STR + Controls + Year\ FE + \varepsilon} \quad \boldsymbol{(3)},$$

where *PROFIT* is one of the following test variables: return on assets *(ROA)* or return on sales *(ROS)* and *STR* is the country-year statutory tax rate. In line with prior literature, we include the following test variables: Firm size *(LNTOAS)*, leverage *(LVG)*, asset turnover *(ATURN)*, the natural logarithm of the compensation expense *(LNSTAF)*, the natural logarithm of tangible fixed assets *(LNTA)*, and the percentage change in GDP in year t relative to year t-1 *(ΔGDP)*. Incentives to engage in income shifting increase with the country-level statutory rates. To the degree that the Big 4 are shift more income out of high tax rate affiliates, one would expect to find a negative coefficient on the interaction term *B4 X STR*.

To test H2c and H2d, we repeat regression (3) after including the 3-way interaction term of the Big 4 indicator, the country-level statutory tax rate, and variable *ENF* or *BTC,* as well as the respective control variables. In particular, we perform the following OLS regressions:

$$PROFIT = a_0 + a_1 B4 + a_2 B4\ X\ ENF + a_3 B4\ X\ STR + a_4 B4\ X\ STR\ X\ ENF + a_5 STR\ X\ ENF + a_6 STR + a_7 ENF + Controls + Year\ FE + \varepsilon \quad (4)$$

$$PROFIT = a_0 + a_1 B4 + a_2 B4\ X\ BTC + a_3 B4\ X\ STR + a_4 B4\ X\ STR\ X\ BTC + a_5 STR\ X\ BTC + a_6 STR + a_7 BTC + Controls + Year\ FE + \varepsilon \quad (5)$$

Variables are defined as previously.

5. Sample Selection, Descriptive Statistics, and Correlations

5.1 Sample Selection

Our source of financial data is the 2015 file of the Amadeus database supplied by Bureau van Dijk. Amadeus provides private firm data for a large number of European private companies and is compiled from several well-established national data providers. Big 4 accounting firms as well as their industry peers are private firms and they are therefore required to comply with the Fourth EU Directive and its amendments that mandate the financial statement disclosure and audit of all private firms that meet certain size criteria. Financial data in Amadeus is retained for a rolling period of up to 10 years. When a new year of data is added, the oldest year is dropped. Due to this limitation and in order to allow enough firm-year observations to calculate our variables of interest, we restrict our sample period to years between 2009 and 2013.

Our initial sample consists of all private firms that are classified in Amadeus as firms that engage in accounting, bookkeeping, and auditing activities as well as tax consultancy activities (Peer group code: 6920).[28] We next remove those countries that are not covered in La Porta et al.

[28] Our purpose is to examine to what extent tax expertise affects tax outcomes among industry peers. Our sample therefore excludes Big 4 associated firms with industry classifications that do not relate to audit and tax in order to ensure better comparability between treated and control samples.

(1998) and Atwood et al. (2010)[29] and require all observations to have no missing values for the variables of interest. Finally, we impose audit exemption threshold criteria similar to those laid by the Directive 2006/46/EC of 14 June 2006 that was applicable during our sample period. In particular, we require that firms meet at least two of the following criteria in every year: 1) total assets greater than EUR 4.4 million, 2) sales greater than EUR 8.8 million, and 3) number of employees greater than 50. For our income shifting sample, we further exclude non-Big 4 firms with no majority-owned foreign affiliates and retain only unconsolidated company information. Our full (income shifting) sample consists of 11,689 (898-923, depending on the specification) firm-year observations and 3,746 (229-230) firms from 13 different countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, the Netherlands, Norway, Spain, Sweden, and the United Kingdom). Table 1, panel A (B) presents the sample selection procedure for the full (income shifting) sample, whereas panel C provides a detailed overview of all Big 4 associated firms that engage in auditing and tax-related activities and are incorporated in the 13 countries of the full sample. Panel C shows that the full sample consists of 112 Big 4 associated firms from an initial number of 157 (45 Big 4 associated firms drop due to missing observations in the variables of interest).

5.2 Descriptive Statistics

Table 2, panel A presents descriptive statistics for the pooled full sample, whereas Table 2, panel B presents mean descriptive statistics and a breakdown of the total number of firm-year observations by country for the full sample as well. Panels A and B, show that, on average, Big 4 associated firms comprise 3.8% of the sample. The representation of Big 4 associated firms takes

[29] The countries that drop are the following: Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxembourg, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, and Ukraine.

its highest value in Austria (60.3%) and its lowest in France (1.6%). The very low percentage of representation by Big 4 accounting firms in France is a consequence of the very large number of total firm-year observations in the country (6,368). Perhaps, the most plausible explanation for the dominance of France in the sample is the joint-audit regime which is unique in France and was intended to decrease market concentration and increase industry competition. Table 2, panel B also shows that the highest mean values of non-conforming tax avoidance are reported in Austria *(MEAS1)* and in France and Spain *(MEAS2)*, whereas the lowest in Italy *(MEAS1* and *MEAS2).*

In addition, Big 4 accounting firms audit 15.2% of their industry peers. Information about the name of the statutory auditor is available for a subset of the original sample (8,118 firm-year observations) and is completely missing for Austria as indicated in Table 2, panel B.[30,31] Furthermore, Big 4 accounting firms audit none of their industry peers in Greece, which, to some extent, could be explained by the significant market share of the largest national audit firm (SOL SA) in the country (Caramanis and Lennox 2008). By contrast, in the Netherlands, Big 4 accounting firms enjoy their largest market share in the industry as statutory auditors by auditing 63.2% of their industry peers. In untabulated analysis we further find that the Netherlands is also the only country in which a Big 4 accounting firm serves as the statutory auditor of another Big 4 accounting firm.[32] Panels C and D present the respective pooled and disaggregated (geographical) descriptive statistics for the income shifting sample.

[30] Burgstahler et al. (2006) make a similar observation when describing the coverage of statutory auditor information in their data.

[31] Amadeus does not provide time-series information regarding the identity of the statutory auditor. Instead, information about the statutory auditor is only available for the last available fiscal year. We argue that this probably is not a serious consideration in the current study for two main reasons: first, the sample period is not very long (5 years) and second, we expect auditor switches (from Big 4 to non-Big 4 and vice-versa) to occur rather infrequently, particularly in the private firm market.

[32] In particular, PwC is audited by KPMG and Deloitte is audited by E&Y.

5.3 Correlations

Table 3, panel A presents the univariate correlations of our variables of interest for the full sample. Panel A shows that both non-conforming tax avoidance measures are negatively correlated with the Big 4 indicator *(B4)* at the 1% level. In particular, the related correlation coefficients amount to -0.032 for *MEAS1* and -0.067 for *MEAS2*. Moreover, the two tax avoidance measures are positively correlated with each other at the 1% level (correlation coefficient: 0.522). These findings provide some first evidence that, compared to their industry peers, Big 4 accounting firms engage in less non-conforming tax avoidance. However, Table 3 also shows that being audited by a Big 4 accounting firm is positively correlated with both tax avoidance measures. The related coefficients amount to 0.081 and 0.03 for *MEAS1* and *MEAS2*, respectively and are significant at the 1% level. From the country-specific variables, higher levels of book-tax conformity are negatively correlated with both tax avoidance measures, whereas the existence of strong legal institutions is positively associated with the two alternative tax avoidance measures. These correlations are significant at the 1% level. The correlation matrix of the income shifting sample is presented in Table 3, panel B.

6. Results

6.1 Big 4 Affiliation and Non-Conforming Tax Avoidance

Table 4 presents the results of regression (1) which examines to what extent Big 4 affiliated firms engage in more non-conforming tax avoidance compared to their peers (H1a). The first two columns of Table 4 present the results of regression (1) controlling only for firm size, whereas columns 3 and 4 present the results after the inclusion of all related control variables. Across all alternative specifications we provide strong evidence that Big 4 affiliation is

negatively associated with non-conforming tax avoidance. In particular all related coefficients are negative and significant at the 1% level. In terms of economic significance, the results suggest that Big 4 associated firms have 3-year average ETRs *(MEAS1)* that are approximately 3.4% higher than their industry peers (column 3 of Table 4).

6.2 Big 4 Affiliation and Non-Conforming Tax Avoidance - The Effect of Regulatory Scrutiny

Table 5 presents the results of regression (2) which examines to what extent the strictness of the institutional environment and the level of required book-tax conformity moderate the relation between Big 4 affiliation and non-conforming tax avoidance (H2a and H2b). The first two columns of Table 5 present the results that relate to the moderating role of strict institutional environments, whereas the last two columns the results that relate to the moderating role of required book-tax conformity. To the degree that Big 4 associated firms place greater weight on the political and reputational costs of non-conforming tax avoidance than their peers, the negative relation between Big 4 affiliation and tax avoidance should be significantly weaker in countries with weak institutions and low levels of required book-tax conformity.

Consistent with these expectations, we observe a negative and significant (at the 1% level) coefficient on the interaction between the strength of legal institutions (*ENF)* and tax avoidance (p-value <0.001 in both models). This result is consistent with the negative relation between tax avoidance and Big 4 affiliation being stronger in countries with relatively strong legal institutions. We also find a *positive* and significant at the 1% level coefficient (p-value=0.001 or smaller) on the Big 4 main effect in both *MEAS1* and *MEAS2* specifications suggesting that when legal institutions are weak, Big 4 associated firms avoid *more* taxes.

In columns 3 and 4, we present the results for required book-tax conformity. Once again, we find a negative and significant at the 1% level coefficient (p-value < 0.001) on the interaction between book-tax conformity (*BTC*) and either measure of tax avoidance. We also find a positive and statistically significant at the 1% level coefficient (p-value=0.006 or smaller) for the Big 4 affiliation main effect in both *MEAS1* and *MEAS2* specifications. Thus, when required book-tax conformity is low, the Big 4 avoid more taxes than peer firms. However, when required book-tax conformity is high, the political or reputational costs of non-conforming tax avoidance outweigh the benefits of tax expertise and Big 4 associated firms engage in less non-conforming tax avoidance compared to their peers.

6.3 Big 4 Affiliation and Income Shifting

We next proceed with the analysis of the relation between Big 4 affiliation and income shifting. We present this analysis in Table 6. Table 6, columns (1) and (2) show that Big 4 affiliated firms are associated with greater levels of return on assets (ROA) (column 1) and return on sales (ROS) (column 2); however, these relations weaken significantly in countries with high statutory tax rates. In particular, the related interaction term of the Big 4 indicator with the country level statutory tax rate *(B4 X STR)* is negative and significant at the 1% level (p-value<0.001) in both alternative specifications.

De Simone, Klassen, et al. (2017) argue that incentives to shift income out of high tax rate affiliates weaken when these affiliates are not profitable. Therefore, to investigate the extent to which Big 4 incentives to shift income out of high tax rate affiliates are curbed when these affiliates are unprofitable we follow De Simone, Klassen, et al. (2017) and perform the following regression:

$$PROFIT = a_0 + a_1 B4 + a_2 B4\ X\ LOSS + a_3 B4\ X\ STR + a_4 B4\ X\ STR\ X\ LOSS + a_5 STR\ X\ LOSS + a_6 STR + a_7 LOSS + Controls + Year\ FE + \varepsilon \quad (6)$$

Variables are defined as previously.

In columns (3) and (4) of Table 6 we show that the three-way interaction term *B4 X STR X LOSS* is positive and significant at the 5% (1%) level for the ROA (ROS) specification. These findings thus provide evidence that the Big 4 shift less income out of high tax rate affiliates when these affiliates have losses, thus temporarily serving as low-tax rate affiliates.

6.4 Big 4 Affiliation and Non-Conforming Tax Avoidance - The Effect of Regulatory Scrutiny

The Big 4 might engage in less income shifting when regulatory scrutiny increases if increased monitoring by regulators heightens the political costs associated with their income shifting activities. Alternatively, the Big 4 could shift more income out of tax rate affiliates in the precise context in which they are restricted from engaging in non-conforming avoidance. Table 7 provides evidence consistent with this latter explanation. In particular, column 1 (column 2) of Table 7 shows that the association between statutory tax rates and ROA (ROS) is more negative for the Big 4 than for the non-Big 4 *only* in countries with strong legal institutions. In particular, the three-way interaction term *B4 X STR X ENF* is negative and significant at the 5% level in both alternative specifications (p-values<=0.029). Furthermore, column 3 (column 4) of Table 7 additionally shows that the association between statutory tax rates and ROA (ROS) is more negative for the Big 4 than for the non-Big 4 *only* in countries with higher levels of required book tax conformity, where the Big 4 are more likely to be scrutinized by regulators (the corresponding three-way interaction terms are negative and significant at the 1% level with p-

values<0.001). Taken together, the results of Tables 6 and 7 suggest that, for higher levels of regulatory scrutiny the Big 4 engage in less non-conforming tax avoidance but shift more income out of high tax rate affiliates. This finding is therefore consistent with the argument that the Big 4 are more likely to substitute income shifting for non-conforming tax avoidance as regulatory scrutiny increases.[33]

6.5 Non-Conforming Tax Avoidance and Statutory Tax Rates

The results of Tables 6 and 7 are consistent with Atwood et al. (2012) and Badertscher et al. (2017) who purport that, under certain conditions, non-conforming and conforming tax avoidance may act as substitutes. We next examine the degree to which Big 4 incentives to engage in non-conforming tax avoidance are a function of the country-level statutory tax rate. The Big 4 might engage in higher levels of non-conforming tax avoidance in high statutory tax rate countries where the benefits of non-conforming tax avoidance appear to be greater. However, to the degree that the Big 4 shift their income to low tax rate countries, they might also have strong incentives to maximize their tax savings by engaging in higher levels of non-conforming tax avoidance in those countries that receive the income shifted from their high tax rate affiliates.[34] To examine the moderating role of statutory tax rates on the relation between Big 4 affiliation and non-conforming tax avoidance we regress our non-conforming tax avoidance measures on the Big 4 indicator *(B4)*, the country-level statutory tax rate *(STR)* and their

[33] In untabulated analysis we repeat the regressions of Tables 4 and 5 on the reduced, income shifting sample. We continue to find a negative relation between Big 4 affiliation and non-conforming tax avoidance. Furthermore, we continue to find that this relation is reversed in countries with less strict legal institutions and in countries with low levels of required book-tax conformity.

[34] Holding the costs of non-conforming tax avoidance stable across countries, the benefits of non-conforming tax avoidance should be greater in countries where income is subject to higher statutory tax rate levels. However, this prediction becomes less obvious when companies engage in cross-country income shifting. We argue this because part of the income that would normally be taxed under a higher statutory tax rate is now taxed in a lower statutory tax rate country. Therefore, to magnify the benefits of their income shifting strategy, firms might have relatively stronger incentives to engage in non-conforming tax avoidance in those countries that serve as inbound income shifting locations.

interaction *(B4 X STR)*. We present the results of this analysis in Table 8. Table 8 shows that the negative relation between Big 4 affiliation and non-conforming tax avoidance only holds in countries with high statutory tax rate levels, from which the Big 4 shift more income to low tax rate affiliates. The interaction term *B4 X STR* is negative and significant at the 5% level (1% level) for *MEAS1 (MEAS2)*. By contrast, the Big 4 main effect *(B4)* is positive and significant at the 10% level of better. This finding seems to suggest that, in countries with for low statutory tax rates the Big 4 are likely to avoid paying taxes more compared to their peers. Overall, the findings of this analysis indicate that, in the precise context in which the Big 4 are likely to engage in more (less) inbound income shifting, they are likely to avoid paying taxes more (less).

6.6 Supplemental Analysis

Even though, on average, the Big 4 engage in less non-conforming tax avoidance, there might be settings in which Big 4 incentives to utilize their tax expertise and avoid more taxes weaken the negative link between Big 4 affiliation and non-conforming tax avoidance. We examine two such potential cases in supplemental analysis.

6.6.1 The Effect of Profitability

The Big 4 might have stronger incentives to utilize their tax expertise for higher levels of pre-tax profitability; that is, when the marginal benefits of engaging in tax avoidance are greater. On the other hand, compared to their peers, the Big 4 might engage in more tax avoidance when firm profitability is very low; that is, in the precise context in which the need to maximize their tax savings is greater. Alternatively, Big 4 associated firms might be reluctant to engage in high levels of tax avoidance when they are more profitable because excessive levels of profitability could raise client concerns that they are being overcharged (Lennox and Li 2012).

In Table 9 we present the results of the regression in which we examine the extent to which firm profitability moderates the relation between Big 4 affiliation and non-conforming tax avoidance. Table 9 provides strong evidence that the negative relation between Big 4 affiliation and non-conforming tax avoidance weakens significantly as profitability increases, consistent with the argument that the Big 4 have stronger incentives to utilize their tax expertise when the benefits of non-conforming tax avoidance are greater. In particular, the interaction term of the Big 4 indicator with variable *ROA* is negative and significant at the 1% level (p-value<0.001) under both alternative specifications. In sharp contrast, the main effect of firm profitability is negative and significant at the 1% level (p-value<0.001) for the non-Big 4. This latter finding is in line with the argument that the non-Big 4 engage in more non-conforming tax avoidance as pre-tax profitability decreases; that is, when the need to maximize their tax benefits is greater.

6.6.2 Controlling for Statutory Auditor

Chen et al. (2017) provide evidence that Big 4 auditees are associated with higher levels of non-conforming tax avoidance compared to non-Big 4 auditees in private firms. They explain that Big 4 auditors emphasize tax planning in private firms to better meet the differentiated needs of their private firm clients, which are more weighted towards optimal tax planning that towards audit quality. To the extent that the appointment of a Big 4 auditor by a Big 4 affiliated firm aims to serve primarily tax-related objectives, then one could expect that the relation between Big 4 affiliation and non-conforming tax avoidance is significantly stronger for Big 4 affiliated firms that are audited by Big 4 auditors. This could be the case, to the extent that the Big 4 affiliated firm can benefit from combining its tax expertise with that of its Big 4 auditor. Alternatively, one could argue that Big 4 affiliated firms as well as their Big 4 auditors have particularly high reputation considerations when they pair with each other because their pairing is likely to

heighten the visibility of both parties and attract regulatory scrutiny. Under this scenario, one could expect that the relation between Big 4 affiliation and non-conforming tax avoidance is significantly weaker when a Big 4 affiliated firm is audited by a Big 4 auditor.

To empirically examine this hypothesis, we incorporate variable *B4_AUD,* which takes the value 1 if the statutory auditor is a Big 4 accounting firm, and zero otherwise, in regression (1) and present the results in Table 10. Because information about the statutory auditor is not always available, this analysis is based on a sample of 8,118 firm-year observations. Consistent with Chen et al. (2017) we provide evidence that Big 4 auditees are associated with greater levels of non-conforming tax avoidance compared to non-Big 4 auditees. In particular, the coefficient on variable *B4_AUD* is positive and significant at the 1% level (p-value<0.001) for the *MEAS1* specification (column 1) and positive and significant at the 10% level (p-value=0.076) for the *MEAS2* specification (column 3). In addition, the *B4* indicator remains negative and significant at the 5% level or better (p-values<=0.012). Moreover, the inclusion of the interaction term *B4 X B4_AUD* in columns 2 and 4 indicates that the negative relation between Big 4 affiliation and tax avoidance is significantly mitigated when a Big 4 affiliated firm is audited by a Big 4 auditor. In particular, the related coefficients are positive and significant at the 1% level (p-values<0.001) in both *MEAS1* and *MEAS2* specifications. These findings are consistent with the argument that tax considerations potentially drive the demand for a Big 4 auditor in the industry. It is additionally in line with the argument that, when paired with a Big 4 auditor, Big 4 affiliated firms combine their tax expertise with that of their statutory auditor in order to engage in higher levels of non-conforming tax avoidance.[35]

[35] In untabulated analysis, we investigate the extent to which the Big 4 may engage in more or less income shifting when paired with a Big 4 auditor. We find a negative but insignificant three-way interaction term *B4 X B4_AUD X STR* (p-value=0.286 in the *ROA* specification and p-value=0.244 in the *ROS* specification).

6.7 Robustness Tests

6.7.1 Propensity-Score Matching

We have based our analysis of the relation between Big 4 affiliation and tax avoidance on a sample of peer firms. In other words, by design, our analysis is based on a sample of firms with comparable firm-specific characteristics. However, to mitigate residual considerations that differences in firm-specific characteristics between our treatment and control group may account for the results that we document, we also implement propensity-score matching techniques. In particular, for each alternative specification, we perform a probit regression in which variable *B4* is regressed on the corresponding control variables and fixed effects. We subsequently match, without replacement, a non-Big 4 firm with a Big 4 firm with the closest predicted value of each probit specification, while allowing a maximum caliper distance of 0.01. Table 10 (panels A-G) shows that the results of the propensity-score matched analysis are very similar to original findings.

6.7.2 Removing France from the Full Sample

Roughly 54.5% of our full sample observations originate from France (6,368 firm-year observations out of a total of 11,689 observations). To mitigate considerations that our full sample results are driven by the over-representation of France in the sample, we repeat the regressions of Tables 4, 5, 8, 9, and 10 after excluding France. Results (untabulated) are identical with respect to the sign and qualitatively very similar to original findings.[36]

6.7.3 Including Firms not Subject to Mandatory Financial Statement Filing

[36] These regressions are based on samples of 4,135 to 5,321 firm-year observations, depending on the specification.

Our analysis is based on those private firms that engage in auditing and tax-consultancy activities and are subject to mandatory filing and audit of their financial statements. In untabulated tests, we repeat the tests of Tables 4-10 after including firms that voluntarily choose to file their financial statements and have them audited. Results are again qualitatively very similar to and, in some occasions, stronger than original findings.[37]

6.7.4 Including Firms not Covered in La Porta et al. (1998) and Atwood et al. (2010)

As our final robustness test, we include all firms that are not covered in La Porta et al. (1998) and Atwood et al. (2010) and repeat the tests of Tables 4, 9, and 10. Once again results are qualitatively very similar to original findings.[38]

7. Conclusion

In this study we examine the tax planning behavior of firms that belong to the Big 4 network of companies relative to that of their peers. To this end, we utilize a unique database of Big 4 associated firms that are incorporated in Europe and engage in accounting, auditing, and tax consultancy activities. We argue that Big 4 associated firms could avoid taxes to a greater extent due to their tax expertise. Conversely, Big 4 firms could avoid taxes to a lesser extent if political and reputational costs are more important in determining tax outcomes because the Big 4 face a higher level of scrutiny for their tax practices and are subjected to larger reputational costs if they are found to avoid taxes too aggressively.

We estimate that Big 4 affiliation results in an approximately 3.4 percentage point increase in a firm's three-year GAAP ETR. This finding is consistent with the political and reputational costs of avoiding taxes in a non-conforming way outweighing the benefits of having greater tax

[37] These regressions are based on samples of 1,215 to 23,969 firm-year observations, depending on the specification.
[38] These regressions are based on samples of 8,604 to 12,820 firm-year observations, depending on the specification.

expertise for Big 4 associated firms. However, this relation is reversed in countries with less strict institutional environments and in countries with low book-tax conformity levels where the Big 4 are less likely to be scrutinized by regulatory authorities. We further provide evidence that the Big 4 shift more income out of high tax rate affiliates. In addition, the positive relation between Big 4 affiliation and income shifting is reversed in countries where the Big 4 are less likely to be restricted by regulators; that is, in the precise context in which the Big are less likely to be restricted from engaging in non-conforming tax avoidance. We argue that non-conforming tax avoidance and income shifting have different cost-benefit trade-offs for the Big 4 relative to their peers and that, in certain settings, the Big 4 might be more likely to substitute income shifting for non-conforming tax avoidance and vice-versa. The Big 4 engage in more non-conforming tax avoidance in low tax rate countries; that is, in those countries that are more likely to receive the income shifted from high tax rate affiliates.

Finally, in supplemental analysis, we provide evidence that the negative link between Big 4 affiliation and non-conforming tax avoidance weakens significantly as pre-tax profitability increases; that is, when the benefits of non-conforming tax avoidance are greater. We further show that the negative relation between Big 4 affiliation and non-conforming tax avoidance also weakens when a Big 4 associated firm is audited by another Big 4 auditor. This latter finding suggests that the demand for a Big 4 auditor by a Big 4 affiliated firm could be partly driven by tax-related considerations. It additionally suggests that Big 4 associated firms may be able to leverage their tax expertise when pairing with a Big 4 auditor.

We caution that, we make no claim that the Big 4 (or their peers) engage in the type of tax planning that violates the letter of the prevailing tax regulations. By contrast, we purport that the Big 4 are able to utilize their tax expertise in such a way so that they optimize their tax savings,

while taking actions to protect their reputational capital. This, however, also means that, examining the extent to firms may avoid paying taxes while focusing on one only particular type of tax avoidance, might not be enough to convey the complete picture of the tax planning strategy employed.

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APPENDIX

Variable Definitions

ATURN	The ratio of sales to lagged total assets.
B4	An indicator variable that takes the value of 1 if a firm belongs to the Big 4 group of companies (PwC, KPMG, E&Y or Deloitte), and zero otherwise.
B4_AUD	An indicator variable that takes the value of 1 if a firm is audited by a Big 4 auditor, and zero otherwise.
BTC	The estimated level of required book-tax conformity in Atwood et al. (2010). Greater values of this measure indicate higher levels of required book-tax conformity.
CURR	The ratio of current assets to current liabilities.
ΔGDP	The percentage change in GDP in year t relative to year t-1.
ROA	The ratio of earnings before interest and taxes to lagged total assets.
ROS	The ratio of earnings before interest and taxes to lagged total sales.
ENF	The mean of the efficiency of the judicial system, rule of law, and corruption index in La Porta et al. (1998). Greater values of this measure indicate stricter legal institutions.
GROWTH	The percentage change in sales relative to the previous fiscal year.
LNGDP	The country-year natural logarithm of the real historical Gross Domestic Product (GDP) in billion US dollars (www.ers.usda.gov/).

LNSTAF	The natural logarithm of compensation expense.
LNTA	The natural logarithm of tangible fixed assets.
LNTOAS	The natural logarithm of total assets.
LOSS	An indicator variable that takes the value of 1 if the firm reports negative operating income in a specific fiscal year, and zero otherwise.
LVG	The ratio of short- and long-term debt to total assets.
MEAS1	The 3-year average GAAP effective tax rate (ETR) (from year t-2 to year t) multiplied by -1, so that greater values of the measure are associated with more tax aggressiveness. The yearly effective tax rate is calculated as the ratio of tax expense to pre-tax income: $-[\sum_{t-2}^{t}(TAX\_EXP_{i,t} / PLBT_{i,t})] / 3$.
MEAS2	A variation of the Hanlon and Heitzman (2010) and Atwood et al. (2012) tax avoidance measure: The ratio of the difference between the tax on pre-tax income based on the corresponding country-year statutory tax rate and the tax expense divided by the pretax income over the past three years: $[\sum_{t-2}^{t}(PLBT\ X\ STR)_{i,t} - \sum_{t-2}^{t}(TAX\_EXP)_{i,t}] / \sum_{t-2}^{t} PLBT_{i,t}$. Greater values of this measure indicate more tax avoidance.
METR	The country-legal type-fiscal year median effective tax rate (ETR).
PPE	The ratio of property, plant, and equipment to lagged total assets.
STDROA	The 3-year standard deviation of variable *ROA*.
STR	The country-year statutory tax rate collected by the KPMG website (https://home.kpmg.com/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html).

How we are structured

What is 'PwC'?

PwC is the brand under which the member firms of PricewaterhouseCoopers International Limited (PwCIL) operate and provide professional services. Together, these firms form the PwC network. 'PwC' is often used to refer either to individual firms within the PwC network or to several or all of them collectively.

In many parts of the world, accounting firms are required by law to be locally owned and independent. Although regulatory attitudes on this issue are changing, PwC member firms do not and cannot currently operate as a corporate multinational. The PwC network is not a global partnership, a single firm, or a multinational corporation.

For these reasons, the PwC network consists of firms which are separate legal entities. The firms that make up the network are committed to working together to provide quality service offerings for clients throughout the world. Firms in the PwC network are members in, or have other connections to, PricewaterhouseCoopers International Limited (PwCIL), an English private company limited by guarantee. PwCIL does not practise accountancy or provide services to clients. Rather its purpose is to act as a coordinating entity for member firms in the PwC network. Focusing on key areas such as strategy, brand, and risk and quality, the Network Leadership Team and Board of PwCIL develop and implement policies and initiatives to achieve a common and coordinated approach among individual firms where appropriate. Member firms of PwCIL can use the PwC name and draw on the resources and methodologies of the PwC network. In addition, member firms may draw upon the resources of other member firms and/or secure the provision of professional services by other member firms and/or other entities. In return, member firms are bound to abide by certain common policies and to maintain the standards of the PwC network as put forward by PwCIL.

The PwC network is not one international partnership and PwC member firms are not otherwise legal partners with each other. Many of the member firms have legally registered names which contain “PricewaterhouseCoopers”, however there is no ownership by PwCIL. A member firm cannot act as agent of PwCIL or any other member firm, cannot obligate PwCIL or any other member firm, and is liable only for its own acts or omissions and not those of PwCIL or any other member firm. Similarly, PwCIL cannot act as an agent of any member firm, cannot obligate any member firm, and is liable only for its own acts or omissions.

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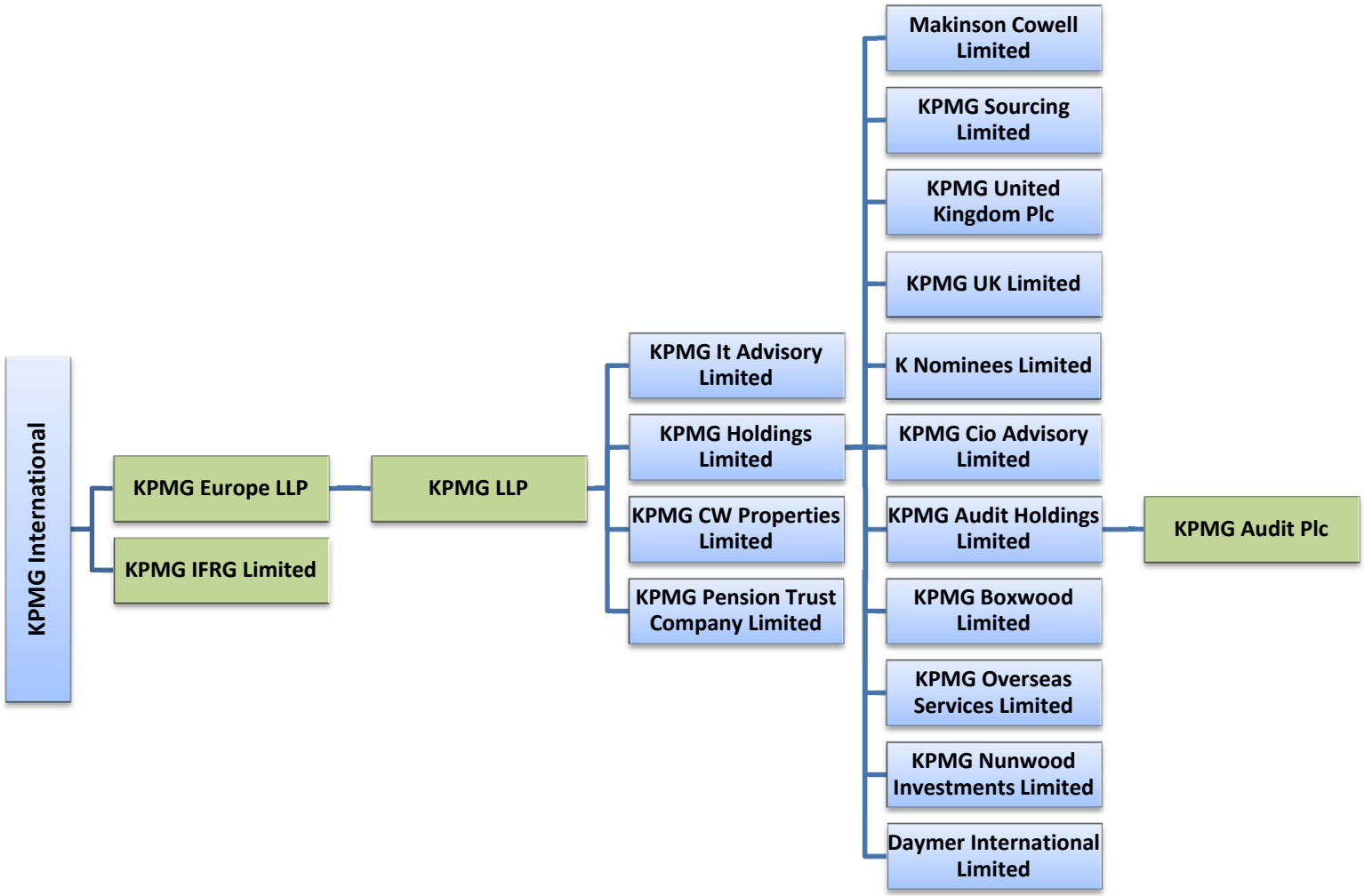
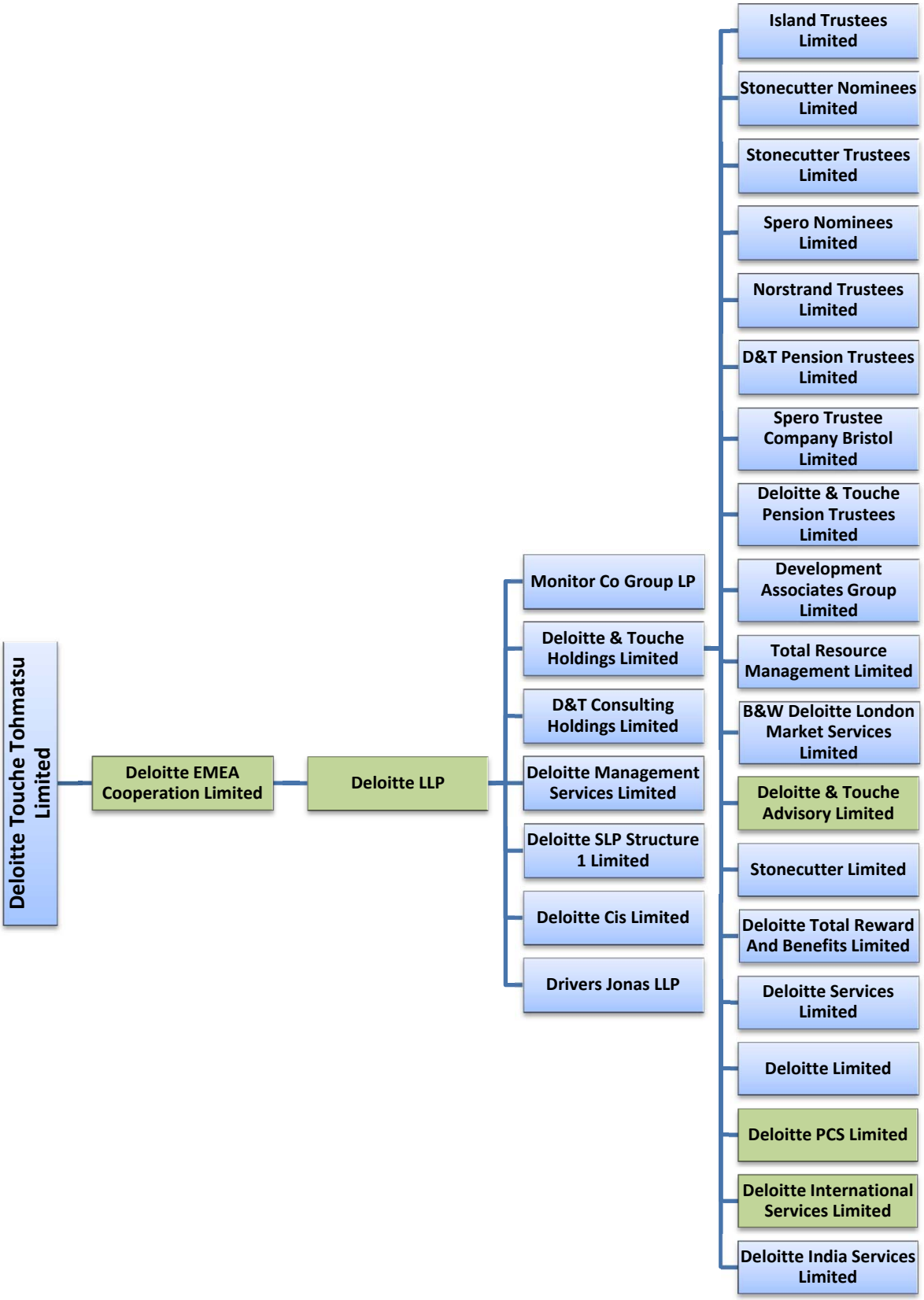
Figure 1

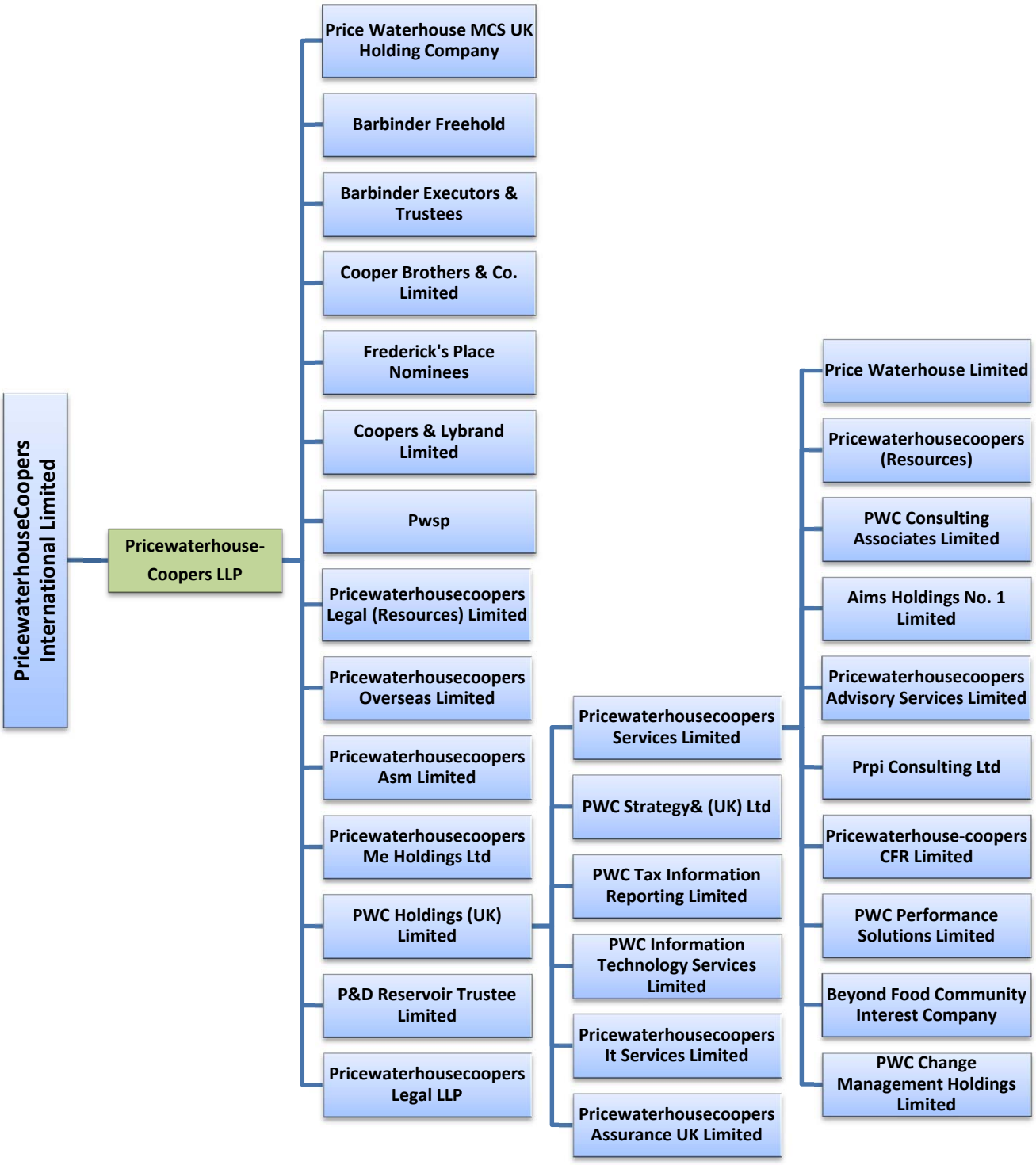
Panel A: KPMG UK Organizational Chart



Panel B: Deloitte UK Organizational Chart



Panel C: PricewaterhouseCoopers UK Organizational Chart



Panel D: Ernst & Young UK Organizational Chart

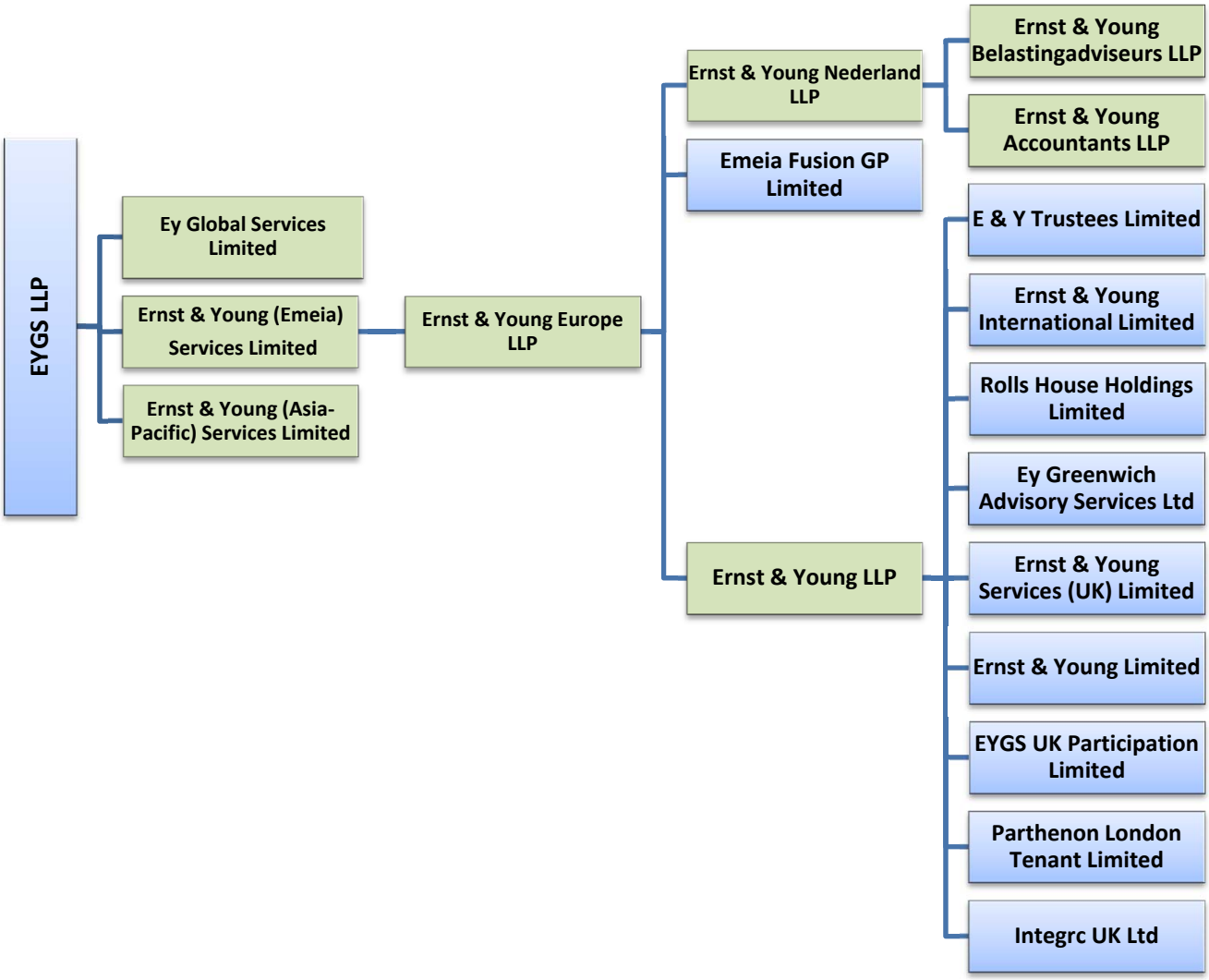


Figure 1 presents the organizational charts of Big 4 affiliated firms that are incorporated in the UK. Panel A presents the organizational chart of KPMG, panel B the organizational chart of Deloitte, whereas panels C and D the organizational charts of PricewaterhouseCoopers and Ernst & Young, respectively. Big 4 affiliated firms that are shaded in green represent those firms that engage in auditing and/or tax consultancy activities. All other firms represent consultancy firms unrelated to audit or tax, as well as firms offering supporting services to the respective company network.

TABLE 1

Panel A: Sample Selection Procedure - Full Sample

Initial Sample		**48,218**
Less observations from countries not covered in La Porta et al. (1998)	-5,440	
Less observations from countries not covered in Atwood et al. (2010)	-771	
Less firms that are not subject to mandatory audit of their financial	-21,821	
Less observations without required financial data	-8,497	
Full Sample		**11,689**

Panel B: Sample Selection Procedure - Income Shifting Sample

Initial Sample		**48,218**
Less observations from countries not covered in La Porta et al. (1998)	-5,440	
Less observations from countries not covered in Atwood et al. (2010)	-771	
Less firms that are not subject to mandatory audit of their financial	-21,821	
Less non-Big 4 firms with no majority-owned foreign affiliates and firms with consolidated financial statements	-17,883	
Less observations without required financial data	-1,380	
Income Shifting Sample		**923**

Panel C: Overview of Big 4 Affiliated Firms that Offer Accounting, Auditing, and Tax-Related Services

No	COUNTRY OF INCORPORATION	CITY OF INCORPORATION	COUNTRY OF OPERATION	BIG 4	FIRM NAME
1	AUSTRIA	WIEN	AUSTRIA	Deloitte	Deloitte Services Wirtschaftspruefungs Gmbh
2	AUSTRIA	WIEN	AUSTRIA	E&Y	Ernst & Young Steuerberatungs-Und Wirtschaftspruefungsges.M.B.H.
3	AUSTRIA	WIEN	AUSTRIA	E&Y	Ernst & Young Wirtschaftspruefungsgesellschaft M.B.H.
4	AUSTRIA	WIEN	AUSTRIA	E&Y	Ernst & Young Servicegmbh & Co Og Steuerberatungsgesellschaft
5	AUSTRIA	WIEN	AUSTRIA	E&Y	Ernst & Young Steuerberatungsund Wirtschaftspruefungsges. Anteilsverwaltungsgmbh
6	AUSTRIA	WIEN	AUSTRIA	E&Y	Ernst & Young Wirtschaftspruefungsgesellscha. Anteilsverwaltungsgmbh
7	AUSTRIA	LINZ	AUSTRIA	KPMG	KPMG Advisory Gmbh
8	AUSTRIA	WIEN	AUSTRIA	KPMG	KPMG Alpen-Treuhand Gmbh Wirtschaftspruefungs- Und Steuerberatungsgesellschaft
9	AUSTRIA	LINZ	AUSTRIA	KPMG	KPMG Austria Gmbh Wirtschaftspruefungs- Und Steuerberatungsgesellschaft
10	AUSTRIA	WIEN	AUSTRIA	KPMG	KPMG Austria Gmbh Wirtschaftspruefungs- Und Steuerberatungsgesellschaft
11	AUSTRIA	MOEDLING	AUSTRIA	KPMG	KPMG Niederoesterreich Gmbh Wirtschaftspruefungs- Und Steuerberatungsgesellschaft
12	AUSTRIA	WIEN	AUSTRIA	KPMG	KPMG Wirtschaftspruefungs- Und Steuerberatungs Ag
13	AUSTRIA	WIEN	AUSTRIA	PwC	PwC PricewaterhouseCoopers Wirtschaftspruefung Und Steuerberatung Gmbh
14	AUSTRIA	WIEN	AUSTRIA	PwC	PwC Wirtschaftspruefung Gmbh
15	AUSTRIA	WIEN	AUSTRIA	PwC	PwC Inter-Treuhand Gmbh
16	AUSTRIA	GRAZ	AUSTRIA	PwC	PwC Steiermark Wirtschaftspruefung Und Steuerberatung Gmbh
17	AUSTRIA	WIEN	AUSTRIA	PwC	PwC Transaction Services Wirtschaftspruefung Gmbh
18	BELGIUM	DIEGEM	BELGIUM	Deloitte	Deloitte Accountancy
19	BELGIUM	DIEGEM	BELGIUM	Deloitte	Deloitte Bedrijfsrevisoren - Reviseurs D'Entreprises
20	BELGIUM	DIEGEM	BELGIUM	Deloitte	Deloitte Belastingconsulenten - Deloitte Conseils Fiscaux
21	BELGIUM	DIEGEM	BELGIUM	Deloitte	Deloitte Global Tax Center (Europe)
22	BELGIUM	DIEGEM	BELGIUM	E&Y	Ernst & Young Accountants - Ernst & Young Experts Comptables
23	BELGIUM	DIEGEM	BELGIUM	E&Y	Ernst & Young Bedrijfsrevisoren / Reviseurs D'Entreprises
24	BELGIUM	DIEGEM	BELGIUM	E&Y	Ernst & Young Fiduciaire
25	BELGIUM	DIEGEM	BELGIUM	E&Y	Ernst & Young Tax Consultants
26	BELGIUM	GENT	BELGIUM	E&Y	Ernst & Young Accountancy Services
27	BELGIUM	GENT	BELGIUM	E&Y	Ernst & Young Lippens & Rabaey Audit
28	BELGIUM	BRUSSEL	BELGIUM	KPMG	KPMG & Partners
29	BELGIUM	BRUXELLES	BELGIUM	KPMG	KPMG Accountants - KPMG Experts-Com Ptables
30	BELGIUM	BRUSSEL	BELGIUM	KPMG	KPMG Vias
31	BELGIUM	INT-STEVENS-WOLUW	BELGIUM	PwC	PricewaterhouseCoopers Tax Consultants
32	BELGIUM	INT-STEVENS-WOLUW	BELGIUM	PwC	PwC Reviseurs D'Entreprises Ou
33	DENMARK	KOBENHAVN S	DENMARK	Deloitte	Deloitte Statsautoriseret Revisionspartnerselskab
34	DENMARK	SOBORG	DENMARK	E&Y	Ernst & Young Denmark P/S
35	DENMARK	FREDERIKSBERG	DENMARK	E&Y	Ernst & Young P/S
36	DENMARK	FREDERIKSBERG	DENMARK	E&Y	EY Gronland Godkendt Revisionsanpartsselskab
37	DENMARK	FREDERIKSBERG	DENMARK	E&Y	EY Net Source A/S
38	DENMARK	HELLERUP	DENMARK	KPMG	KPMG Acor Tax Partnerselskab
39	DENMARK	HELLERUP	DENMARK	PwC	PricewaterhouseCoopers Statsautoriseret Revisions P/S
40	FINLAND	HELSINKI	FINLAND	Deloitte	Deloitte & Touche Oy
41	FINLAND	HELSINKI	FINLAND	E&Y	Ernst & Young Oy
42	FINLAND	HELSINKI	FINLAND	KPMG	KPMG Oy Ab
43	FINLAND	HELSINKI	FINLAND	KPMG	KPMG Julkishallinnon Palvelut Oy

44	FINLAND	HELSINKI	FINLAND	PwC	PricewaterhouseCoopers Oy
45	FINLAND	HELSINKI	FINLAND	PwC	PwC Julkistarkastus Oy
46	FRANCE	NEUILLY SUR SEINE	FRANCE	Deloitte	Deloitte
47	FRANCE	NEUILLY SUR SEINE	FRANCE	Deloitte	Deloitte Accounting Services
48	FRANCE	NEUILLY SUR SEINE	FRANCE	Deloitte	Deloitte Afrique
49	FRANCE	NEUILLY SUR SEINE	FRANCE	Deloitte	Deloitte Audit It Financial Services
50	FRANCE	NEUILLY SUR SEINE	FRANCE	Deloitte	Deloitte Et Associes
51	FRANCE	NEUILLY SUR SEINE	FRANCE	Deloitte	Deloitte Marque & Gendrot
52	FRANCE	NEUILLY SUR SEINE	FRANCE	Deloitte	Deloitte Marque Gendrot
53	FRANCE	NEUILLY SUR SEINE	FRANCE	Deloitte	Deloitte A3
54	FRANCE	COURBEVOIE	FRANCE	E&Y	Ernst & Young Audit
55	FRANCE	COURBEVOIE	FRANCE	E&Y	Ernst & Young Et Associes
56	FRANCE	COURBEVOIE	FRANCE	E&Y	Ernst & Young Et Autres
57	FRANCE	NANTES	FRANCE	E&Y	Ernst Et Young Atlantique
58	FRANCE	PUTEAUX	FRANCE	KPMG	KPMG
59	FRANCE	PUTEAUX	FRANCE	KPMG	KPMG Fiduciaire De France
60	FRANCE	SCHILTIGHEIM	FRANCE	KPMG	KPMG Audit Est
61	FRANCE	PUTEAUX	FRANCE	KPMG	KPMG Audit Fs I
62	FRANCE	PUTEAUX	FRANCE	KPMG	KPMG Audit Fs Ii
63	FRANCE	PUTEAUX	FRANCE	KPMG	KPMG Audit Id
64	FRANCE	PUTEAUX	FRANCE	KPMG	KPMG Audit Is
65	FRANCE	MARCQ EN BAROEUL	FRANCE	KPMG	KPMG Audit Nord
66	FRANCE	HEROUVILLE ST CLAIR	FRANCE	KPMG	KPMG Audit Normandie
67	FRANCE	NANTES	FRANCE	KPMG	KPMG Audit Ouest
68	FRANCE	PUTEAUX	FRANCE	KPMG	KPMG Audit Paris Et Centre
69	FRANCE	LYON	FRANCE	KPMG	KPMG Audit Rhone-Alpes Auvergne
70	FRANCE	MARSEILLE	FRANCE	KPMG	KPMG Audit Sud-Est
71	FRANCE	LABEGE	FRANCE	KPMG	KPMG Audit Sud-Ouest
72	FRANCE	ST DENIS	FRANCE	KPMG	KPMG Tartaroli
73	FRANCE	NEUILLY SUR SEINE	FRANCE	PwC	PricewaterhouseCoopers Audit
74	FRANCE	NEUILLY SUR SEINE	FRANCE	PwC	PricewaterhouseCoopers Entreprises
75	FRANCE	NEUILLY SUR SEINE	FRANCE	PwC	PwC Audit
76	FRANCE	NEUILLY SUR SEINE	FRANCE	PwC	PwC Sellam
77	GERMANY	MUENCHEN	GERMANY	Deloitte	Deloitte & Touche Gmbh Wirtschaftspruefungs- Gesellschaft
78	GERMANY	STUTTGART	GERMANY	E&Y	Ernst & Young Law Gmbh Rechtsanwaltsgesellschaft Steuerberatungsgesellschaft
79	GERMANY	BERLIN	GERMANY	KPMG	KPMG Ag Wirtschafts- Pruefungsgesellschaft
80	GERMANY	FRANKFURT	GERMANY	PwC	PricewaterhouseCoopers Aktiengesellschaft Wirtschaftspruefungsges.
81	GERMANY	FRANKFURT	GERMANY	PwC	PricewaterhouseCoopers Corporate Finance Beratung Gmbh
82	GERMANY	FRANKFURT	GERMANY	PwC	PwC Europe Aktiengesellschaft Wirtschaftspruefungsgesellscha.
83	GREECE	MAROUSSI	GREECE	Deloitte	Deloitte Hadjipavlou Sofianos & Cambanis S.A.
84	GREECE	MAROUSSI	GREECE	Deloitte	Deloitte Accounting Compliance & Reporting Services S.A.
85	GREECE	MAROUSSI	GREECE	E&Y	Ernst & Young (Hellas) Certified Auditors Accountants S.A.
86	GREECE	METAMORFOSSI	GREECE	E&Y	Ernst & Young Services S.A.
87	GREECE	AGIA PARASKEVI	GREECE	KPMG	KPMG Accountants S.A.
88	GREECE	AGIA PARASKEVI	GREECE	KPMG	KPMG Certified Auditors A.E.
89	GREECE	HALANDRI	GREECE	PwC	PricewaterhouseCoopers S.A.

90	GREECE	HALANDRI	GREECE	PwC	PricewaterhouseCoopers Accounting S.A.
91	ITALY	MILANO	ITALY	Deloitte	Deloitte & Touche S.P.A.
92	ITALY	ROMA	ITALY	E&Y	Reconta Ernst & Young S.P.A.
93	ITALY	MILANO	ITALY	KPMG	KPMG Audit S.P.A.
94	ITALY	MILANO	ITALY	KPMG	KPMG S.P.A.
95	ITALY	MILANO	ITALY	PwC	PricewaterhouseCoopers S.P.A. In Breve PwC
96	NETHERLANDS	ROTTERDAM	NETHERLANDS	Deloitte	Deloitte Accountants B.V.
97	NETHERLANDS	ROTTERDAM	NETHERLANDS	Deloitte	Deloitte Belastingadviseurs B.V.
98	NETHERLANDS	ROTTERDAM	NETHERLANDS	Deloitte	Deloitte Holding B.V.
99	NETHERLANDS	AMSTELVEEN	NETHERLANDS	KPMG	KPMG Mkb B.V.
100	NETHERLANDS	AMSTERDAM	NETHERLANDS	PwC	Cooperatie PricewaterhouseCoopers Nederland U.A.
101	NETHERLANDS	AMSTERDAM	NETHERLANDS	PwC	Holding PricewaterhouseCoopers Nederland B.V.
102	NETHERLANDS	AMSTERDAM	NETHERLANDS	PwC	PricewaterhouseCoopers B.V.
103	NETHERLANDS	'S-GRAVENHAGE	NETHERLANDS	PwC	PricewaterhouseCoopers Eastern Europe B.V.
104	NETHERLANDS	'S-GRAVENHAGE	NETHERLANDS	PwC	PricewaterhouseCoopers Russia B.V.
105	NETHERLANDS	AMSTERDAM	NETHERLANDS	PwC	PricewaterhouseCoopers Accountants N.V.
106	NETHERLANDS	AMSTERDAM	NETHERLANDS	PwC	PricewaterhouseCoopers Belastingadviseurs N.V.
107	NETHERLANDS	AMSTERDAM	NETHERLANDS	PwC	PricewaterhouseCoopers Compliance Services B.V.
108	NETHERLANDS	AMSTERDAM	NETHERLANDS	PwC	PricewaterhouseCoopers N.V.
109	NORWAY	OSLO	NORWAY	Deloitte	Deloitte & Touche Da
110	NORWAY	OSLO	NORWAY	Deloitte	Deloitte As
111	NORWAY	OSLO	NORWAY	E&Y	Ernst & Young As
112	NORWAY	OSLO	NORWAY	E&Y	Ernst & Young Value Added Tax Services As
113	NORWAY	OSLO	NORWAY	KPMG	KPMG As
114	NORWAY	STRAUME	NORWAY	KPMG	KPMG As
115	NORWAY	OSLO	NORWAY	KPMG	KPMG Holding As
116	NORWAY	OSLO	NORWAY	KPMG	KPMG Tax As
117	NORWAY	OSLO	NORWAY	KPMG	KPMG Accounting As
118	NORWAY	OSLO	NORWAY	PwC	PricewaterhouseCoopers Accounting As
119	NORWAY	OSLO	NORWAY	PwC	PricewaterhouseCoopers As
120	NORWAY	OSLO	NORWAY	PwC	PricewaterhouseCoopers Skatteradgivere As
121	NORWAY	BERGEN	NORWAY	PwC	PwC Accounting Bergen As
122	SPAIN	MADRID	SPAIN	Deloitte	Deloitte Asesores Tributarios Sl
123	SPAIN	MADRID	SPAIN	Deloitte	Deloitte Sl
124	SPAIN	MADRID	SPAIN	E&Y	Ernst & Young Servicios Corporativos Sl
125	SPAIN	MADRID	SPAIN	E&Y	Ernst & Young Sl
126	SPAIN	MADRID	SPAIN	KPMG	KPMG Abogados Sl
127	SPAIN	MADRID	SPAIN	KPMG	KPMG Auditores Sl
128	SPAIN	MADRID	SPAIN	KPMG	KPMG Asesores Sl
129	SPAIN	MADRID	SPAIN	PwC	PricewaterhouseCoopers Auditores Sl
130	SPAIN	MADRID	SPAIN	PwC	PricewaterhouseCoopers Compliance Services Sl
131	SPAIN	BILBAO	SPAIN	PwC	PricewaterhouseCoopers Sociedad Limitada
132	SPAIN	MALAGA	SPAIN	PwC	PricewaterhouseCoopers Service Delivery Center (Malaga) Sl.
133	SWEDEN	STOCKHOLM	SWEDEN	Deloitte	Deloitte Ab
134	SWEDEN	STOCKHOLM	SWEDEN	Deloitte	Deloitte & Touche Sverige Ab
135	SWEDEN	STOCKHOLM	SWEDEN	E&Y	Ernst & Young Aktiebolag

136	SWEDEN	STOCKHOLM	SWEDEN	E&Y	Ernst & Young Corporate Finance Ab
137	SWEDEN	STOCKHOLM	SWEDEN	KPMG	KPMG Ab
138	SWEDEN	STOCKHOLM	SWEDEN	PwC	Ohrlings PricewaterhouseCoopers Ab
139	SWEDEN	STOCKHOLM	SWEDEN	PwC	PricewaterhouseCoopers I Sverige Ab
140	UNITED KINGDOM	LONDON	UNITED KINGDOM	Deloitte	Deloitte Llp
141	UNITED KINGDOM	LONDON	UNITED KINGDOM	Deloitte	Deloitte Pcs Limited
142	UNITED KINGDOM	LONDON	UNITED KINGDOM	Deloitte	Deloitte & Touche Advisory Limited
143	UNITED KINGDOM	LONDON	UNITED KINGDOM	Deloitte	Deloitte Emea Co-Operation Limited
144	UNITED KINGDOM	LONDON	UNITED KINGDOM	Deloitte	Deloitte International Services Limited
145	UNITED KINGDOM	LONDON	UNITED KINGDOM	E&Y	Ernst & Young Europe Llp
146	UNITED KINGDOM	LONDON	NETHERLANDS	E&Y	Ernst & Young Nederland Llp
147	UNITED KINGDOM	LONDON	UNITED KINGDOM	E&Y	Ernst & Young (Asia-Pacific) Services Limited
148	UNITED KINGDOM	LONDON	UNITED KINGDOM	E&Y	Ernst & Young (Emeia) Services Limited
149	UNITED KINGDOM	LONDON	NETHERLANDS	E&Y	Ernst & Young Accountants Llp
150	UNITED KINGDOM	LONDON	NETHERLANDS	E&Y	Ernst & Young Belastingadviseurs Llp
151	UNITED KINGDOM	LONDON	UNITED KINGDOM	E&Y	Ernst & Young Llp
152	UNITED KINGDOM	LONDON	UNITED KINGDOM	E&Y	EY Global Services Limited
153	UNITED KINGDOM	LONDON	UNITED KINGDOM	KPMG	KPMG Audit Plc
154	UNITED KINGDOM	LONDON	UNITED KINGDOM	KPMG	KPMG Europe Llp
155	UNITED KINGDOM	LONDON	UNITED KINGDOM	KPMG	KPMG Ifrg Limited
156	UNITED KINGDOM	LONDON	UNITED KINGDOM	KPMG	KPMG Llp
157	UNITED KINGDOM	LONDON	UNITED KINGDOM	PwC	PricewaterhouseCoopers Llp

Table 1, panel A (panel B) presents the sample selection procedure for the full (income shifting) sample. The initial sample includes all firms that offer accounting, auditing, and tax consultancy services during the period 2009-2013. The full (income shifting) sample consists of all firm-year observations with sufficient data to be included in at least one of the regression analyses. Panel C presents a detailed overview of all Big 4 affiliated firms that engage in accounting, auditing, and tax consultancy services and are incorporated in the 13 countries which are included in the full sample. Big 4 firms that are excluded from the full sample due to missing data in the variables of interest are shaded in gray.

TABLE 2

Panel A: Aggregate Descriptive Statistics - Full Sample

Variables	**N**	**Mean**	**St. Deviation**	**25%**	**Median**	**75%**
MEAS1	11,689	-0.265	0.231	-0.313	-0.269	-0.161
MEAS2	11,689	0.038	0.338	-0.004	0.045	0.154
B4	11,689	0.038	0.190	0	0	0
B4_AUD	8,118	0.152	0.359	0	0	0
LNTOAS	11,689	15.420	1.613	14.210	15.120	16.100
LVG	11,689	0.137	0.225	0.000	0.049	0.190
ROA	11,689	0.120	0.166	0.028	0.075	0.158
STDROA	11,689	0.075	0.229	0.014	0.029	0.063
GROWTH	11,689	0.122	0.603	-0.013	0.030	0.109
PPE	11,689	0.099	0.179	0.012	0.037	0.097
CURR	11,689	2.001	3.963	1.010	1.280	1.770
ATURN	11,689	1.416	1.238	0.812	1.200	1.780
LOSS	11,689	0.107	0.309	0	0	0
METR	11,689	-0.277	0.105	-0.281	-0.251	-0.238
BTC	11,689	0.929	0.204	0.8	0.8	1
ENF	11,689	9.272	0.396	9.274	9.274	9.274
STR	11,689	31.32	2.79	30.00	33.33	33.33
LNGDP	11,689	7.410	0.740	7.239	7.862	7.902

Panel B: Descriptive Statistics by Country - Full Sample

		MEAS1	*MEAS2*	*B4*	*B4_AUD*	*LNTOAS*	*LVG*	*ROA*	*STDROA*	*GROWTH*	*PPE*	*CURR*	*ATURN*	*LOSS*	*METR*	*BTC*	*ENF*	*STR*	*LNGDP*
AUSTRIA	**No. Obs**	**63**	**63**	**63**	**0**	**63**	**63**	**63**	**63**	**63**	**63**	**63**	**63**	**63**	**63**	**63**	**63**	**63**	**63**
	Mean	*-0.139*	*0.039*	*0.603*	*.*	*16.940*	*0.030*	*0.052*	*0.109*	*0.127*	*0.037*	*4.491*	*1.415*	*0.206*	*-0.188*	*0.900*	*9.763*	*25.000*	*5.986*
BELGIUM	**No. Obs**	**216**	**216**	**216**	**134**	**216**	**216**	**216**	**216**	**216**	**216**	**216**	**216**	**216**	**216**	**216**	**216**	**216**	**216**
	Mean	*-0.446*	*-0.128*	*0.231*	*0.067*	*16.810*	*0.168*	*0.049*	*0.033*	*0.093*	*0.114*	*3.624*	*1.318*	*0.181*	*-0.286*	*1.400*	*9.703*	*33.990*	*6.191*
DENMARK	**No. Obs**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**
	Mean	*-0.183*	*0.071*	*0.108*	*0.054*	*17.560*	*0.018*	*0.159*	*0.047*	*0.034*	*0.133*	*1.095*	*1.852*	*0.054*	*-0.180*	*1.000*	*9.660*	*25.000*	*5.770*
FINLAND	**No. Obs**	**227**	**227**	**227**	**212**	**227**	**227**	**227**	**227**	**227**	**227**	**227**	**227**	**227**	**227**	**227**	**227**	**227**	**227**
	Mean	*-0.200*	*0.054*	*0.079*	*0.410*	*14.950*	*0.077*	*0.158*	*0.100*	*0.349*	*0.114*	*3.146*	*2.209*	*0.163*	*-0.250*	*1.000*	*9.607*	*25.340*	*5.517*
FRANCE	**No. Obs**	**6,368**	**6,368**	**6,368**	**3,983**	**6,368**	**6,368**	**6,368**	**6,368**	**6,368**	**6,368**	**6,368**	**6,368**	**6,368**	**6,368**	**6,368**	**6,368**	**6,368**	**6,368**
	Mean	*-0.223*	*0.102*	*0.016*	*0.009*	*14.630*	*0.115*	*0.106*	*0.051*	*0.092*	*0.050*	*1.663*	*1.207*	*0.033*	*-0.242*	*0.800*	*9.274*	*33.330*	*7.892*
GERMANY	**No. Obs**	**154**	**154**	**154**	**136**	**154**	**154**	**154**	**154**	**154**	**154**	**154**	**154**	**154**	**154**	**154**	**154**	**154**	**154**
	Mean	*-0.335*	*-0.019*	*0.084*	*0.346*	*16.880*	*0.109*	*0.077*	*0.077*	*0.094*	*0.103*	*3.976*	*1.901*	*0.078*	*-0.326*	*1.600*	*9.634*	*29.440*	*8.151*
GREECE	**No. Obs**	**64**	**64**	**64**	**51**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**64**
	Mean	*-0.315*	*-0.117*	*0.344*	*0.000*	*15.570*	*0.148*	*0.157*	*0.106*	*0.088*	*0.092*	*1.459*	*1.985*	*0.125*	*-0.247*	*1.400*	*6.641*	*23.130*	*5.624*
ITALY	**No. Obs**	**1,265**	**1,265**	**1,265**	**705**	**1,265**	**1,265**	**1,265**	**1,265**	**1,265**	**1,265**	**1,265**	**1,265**	**1,265**	**1,265**	**1,265**	**1,265**	**1,265**	**1,265**
	Mean	*-0.546*	*-0.280*	*0.019*	*0.106*	*15.610*	*0.157*	*0.066*	*0.059*	*0.100*	*0.225*	*2.136*	*1.220*	*0.322*	*-0.532*	*1.000*	*8.951*	*31.400*	*7.649*
NETHERLANDS	**No. Obs**	**189**	**189**	**189**	**182**	**189**	**189**	**189**	**189**	**189**	**189**	**189**	**189**	**189**	**189**	**189**	**189**	**189**	**189**
	Mean	*-0.224*	*0.021*	*0.180*	*0.632*	*17.300*	*0.132*	*0.102*	*0.069*	*0.038*	*0.172*	*1.501*	*1.968*	*0.243*	*-0.211*	*0.900*	*9.777*	*25.160*	*6.730*
NORWAY	**No. Obs**	**1,452**	**1,452**	**1,452**	**1,451**	**1,452**	**1,452**	**1,452**	**1,452**	**1,452**	**1,452**	**1,452**	**1,452**	**1,452**	**1,452**	**1,452**	**1,452**	**1,452**	**1,452**
	Mean	*-0.255*	*0.017*	*0.030*	*0.307*	*16.010*	*0.079*	*0.262*	*0.136*	*0.220*	*0.098*	*1.818*	*2.340*	*0.085*	*-0.271*	*1.300*	*9.863*	*28.000*	*6.072*
SPAIN	**No. Obs**	**1,132**	**1,132**	**1,132**	**733**	**1,132**	**1,132**	**1,132**	**1,132**	**1,132**	**1,132**	**1,132**	**1,132**	**1,132**	**1,132**	**1,132**	**1,132**	**1,132**	**1,132**
	Mean	*-0.201*	*0.102*	*0.033*	*0.454*	*16.940*	*0.259*	*0.070*	*0.124*	*0.142*	*0.190*	*2.940*	*1.075*	*0.223*	*-0.247*	*0.800*	*8.573*	*30.000*	*7.251*
SWEDEN	**No. Obs**	**303**	**303**	**303**	**289**	**303**	**303**	**303**	**303**	**303**	**303**	**303**	**303**	**303**	**303**	**303**	**303**	**303**	**303**
	Mean	*-0.210*	*0.053*	*0.083*	*0.211*	*18.840*	*0.235*	*0.108*	*0.163*	*0.298*	*0.233*	*2.907*	*1.910*	*0.248*	*-0.221*	*1.200*	*9.660*	*25.250*	*6.199*
UNITED KINGDOM	**No. Obs**	**219**	**219**	**219**	**205**	**219**	**219**	**219**	**219**	**219**	**219**	**219**	**219**	**219**	**219**	**219**	**219**	**219**	**219**
	Mean	*-0.232*	*0.038*	*0.132*	*0.102*	*16.490*	*0.372*	*0.223*	*0.087*	*0.060*	*0.075*	*2.032*	*1.788*	*0.096*	*-0.170*	*1.000*	*9.302*	*25.280*	*7.803*
Total	**No. Obs**	**11,689**	**11,689**	**11,689**	**8,118**	**11,689**	**11,689**	**11,689**	**11,689**	**11,689**	**11,689**	**11,689**	**11,689**	**11,689**	**11,689**	**11,689**	**11,689**	**11,689**	**11,689**
	Mean	*-0.265*	*0.038*	*0.038*	*0.152*	*15.420*	*0.137*	*0.120*	*0.075*	*0.122*	*0.099*	*2.001*	*1.416*	*0.107*	*-0.277*	*0.929*	*9.272*	*31.320*	*7.410*

Panel C: Aggregate Descriptive Statistics - Income Shifting Sample

Variables	**N**	**Mean**	**St. Deviation**	**25%**	**Median**	**75%**
ROA	901	0.072	0.089	0.003	0.037	0.117
ROS	923	0.105	0.138	0.006	0.052	0.145
B4	923	0.352	0.478	0	0	1
LNTOAS	923	17.97	1.905	16.51	17.89	19.53
LVG	923	0.187	0.303	0	0.065	0.264
CURR	923	2.342	4.653	0.980	1.300	1.990
ATURN	923	1.432	1.395	0.390	1.381	2.018
LOSS	917	0.176	0.381	0	0	0
LNSTAF	923	16.13	2.439	14.04	15.99	17.560
LNTA	923	14.38	3.051	12.15	14.43	16.840
ΔGDP	923	-0.005	0.024	-0.021	0.000	0.013
STR	923	29.15	3.247	26.30	30	31.40

Panel D: Descriptive Statistics by Country - Income Shifting Sample

		ROA	*ROS*	*B4*	*LNTOAS*	*LVG*	*CURR*	*ATURN*	*LOSS*	*LNSTAF*	*LNTA*	*ΔGDP*	*STR*
AUSTRIA	**No. Obs**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**
	Mean	*0.051*	*0.052*	*0.911*	*16.77*	*0.025*	*2.818*	*1.662*	*0.178*	*15.870*	*12.430*	*0.002*	*25.000*
BELGIUM	**No. Obs**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**86**	**89**	**89**	**89**	**89**
	Mean	*0.022*	*0.079*	*0.337*	*17.280*	*0.241*	*1.694*	*1.621*	*0.221*	*15.620*	*13.700*	*0.003*	*33.990*
DENMARK	**No. Obs**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
	Mean	*0.114*	*0.051*	*0.400*	*18.100*	*0.000*	*1.346*	*2.568*	*0.200*	*18.930*	*14.810*	*-0.002*	*25.000*
FINLAND	**No. Obs**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**
	Mean	*0.065*	*0.047*	*0.655*	*17.550*	*0.091*	*1.989*	*1.699*	*0.241*	*16.740*	*14.670*	*-0.003*	*25.430*
FRANCE	**No. Obs**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**
	Mean	*0.059*	*0.087*	*0.393*	*17.280*	*0.124*	*1.795*	*1.414*	*0.011*	*16.420*	*12.950*	*0.003*	*33.330*
GERMANY	**No. Obs**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**	**33**
	Mean	*0.051*	*0.043*	*0.394*	*18.130*	*0.084*	*3.433*	*2.789*	*0.030*	*17.960*	*15.090*	*0.005*	*29.450*
GREECE	**No. Obs**	**27**	**27**	**27**	**27**	**27**	**27**	**27**	**27**	**27**	**27**	**27**	**27**
	Mean	*0.103*	*0.073*	*0.815*	*15.72*	*0.277*	*1.470*	*2.276*	*0.111*	*13.650*	*11.710*	*-0.050*	*23.110*
ITALY	**No. Obs**	**76**	**76**	**76**	**76**	**76**	**76**	**76**	**76**	**76**	**76**	**76**	**76**
	Mean	*0.092*	*0.162*	*0.263*	*17.460*	*0.076*	*1.822*	*1.121*	*0.092*	*15.600*	*13.200*	*-0.016*	*31.400*
NETHERLANDS	**No. Obs**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**
	Mean	*0.083*	*0.068*	*0.500*	*18.280*	*0.110*	*1.479*	*1.411*	*0.300*	*13.810*	*14.310*	*-0.005*	*25.190*
NORWAY	**No. Obs**	**71**	**70**	**70**	**70**	**70**	**70**	**70**	**70**	**70**	**70**	**70**	**70**
	Mean	*0.106*	*0.099*	*0.543*	*18.330*	*0.055*	*1.063*	*1.804*	*0.014*	*18.180*	*14.930*	*0.007*	*28.000*
SPAIN	**No. Obs**	**280**	**283**	**283**	**283**	**283**	**283**	**283**	**280**	**283**	**283**	**283**	**283**
	Mean	*0.059*	*0.127*	*0.060*	*18.000*	*0.284*	*3.308*	*0.970*	*0.268*	*15.360*	*14.470*	*-0.015*	*30.000*
SWEDEN	**No. Obs**	**71**	**71**	**71**	**71**	**71**	**71**	**71**	**71**	**71**	**71**	**71**	**71**
	Mean	*0.100*	*0.085*	*0.352*	*19.730*	*0.154*	*2.536*	*1.480*	*0.239*	*17.670*	*17.390*	*0.008*	*25.330*
UNITED KINGDOM	**No. Obs**	**36**	**56**	**56**	**56**	**56**	**56**	**56**	**56**	**56**	**56**	**56**	**56**
	Mean	*0.181*	*0.177*	*0.679*	*18.530*	*0.347*	*1.861*	*1.774*	*0.107*	*18.430*	*16.730*	*0.006*	*25.640*
Total	**No. Obs**	**901**	**923**	**923**	**923**	**923**	**923**	**923**	**917**	**923**	**923**	**923**	**923**
	Mean	*0.072*	*0.105*	*0.352*	*17.880*	*0.187*	*2.342*	*1.432*	*0.176*	*16.130*	*14.380*	*-0.005*	*29.150*

This table presents descriptive statistics for the sample period (2009-2013). Panel A (panel C) provides aggregate descriptive statistics for the full (income shifting) sample. Panel B (panel D) presents information about the number of observations and mean values of all variables by country for the full (income shifting) sample. See Appendix for variable definitions.

TABLE 3

Panel A: Correlation Matrix - Full Sample

Variable	*MEAS1*	*MEAS2*	*B4*	*B4_AUD*	*LNTOAS*	*LVG*	*ROA*	*STDROA*	*GROWTH*	*PPE*	*CURR*	*ATURN*	*LOSS*	*METR*	*BTC*	*ENF*	*STR*	*LNGDP*
MEAS1	1																	
MEAS2	**0.522**	1																
B4	**-0.032**	**-0.067**	1															
B4_AUD	**0.081**	**0.030**	**-0.058**	1														
LNTOAS	**0.035**	-0.010	**0.298**	**0.307**	1													
LVG	**0.044**	0.012	**-0.033**	**0.044**	**0.211**	1												
ROA	**-0.021**	-0.015	**0.041**	0.006	**-0.073**	**-0.033**	1											
STDROA	**0.057**	0.013	0.013	**0.096**	**0.069**	**0.114**	**0.225**	1										
GROWTH	0.016	-0.015	**0.033**	**0.032**	**0.025**	**0.320**	**0.317**	**0.232**	1									
PPE	**-0.080**	**-0.093**	**-0.070**	**0.072**	**0.210**	**0.424**	0.013	**0.075**	**0.288**	1								
CURR	**0.057**	**0.024**	-0.016	**0.095**	**0.105**	**-0.047**	**-0.037**	**0.019**	**-0.035**	**-0.021**	1							
ATURN	**-0.066**	**-0.083**	**0.094**	**0.075**	**-0.096**	**0.123**	**0.439**	**0.225**	**0.703**	**0.162**	**-0.131**	1						
LOSS	**-0.030**	**-0.097**	0.003	**0.126**	**0.188**	**0.143**	**-0.302**	**0.034**	-0.016	**0.171**	**0.024**	**-0.059**	1					
METR	**0.462**	**0.346**	**0.031**	**0.033**	0.005	0.012	**0.122**	0.017	-0.004	**-0.195**	**0.020**	0.008	**-0.212**	1				
BTC	**-0.154**	**-0.158**	**0.111**	**0.216**	**0.349**	**-0.034**	**0.205**	**0.089**	**0.058**	**0.118**	**0.052**	**0.276**	**0.092**	**-0.206**	1			
ENF	**0.076**	**0.045**	0.017	**0.065**	0.004	**-0.146**	**0.217**	**0.021**	**0.038**	**-0.121**	**-0.022**	**0.217**	**-0.112**	**0.200**	**0.452**	1		
STR	-0.006	**0.069**	**-0.153**	**-0.351**	**-0.480**	**-0.074**	**-0.180**	**-0.125**	**-0.075**	**-0.182**	**-0.059**	**-0.260**	**-0.143**	**-0.023**	**-0.611**	**-0.183**	1	
LNGDP	-0.004	**0.059**	**-0.143**	**-0.320**	**-0.393**	**0.023**	**-0.218**	**-0.121**	**-0.084**	**-0.126**	**-0.055**	**-0.281**	**-0.100**	**-0.042**	**-0.733**	**-0.380**	**0.784**	1

Panel B: Correlation Matrix- Income Shifting Sample

Variable	*ROA*	*ROS*	*B4*	*LNTOAS*	*LVG*	*CURR*	*ATURN*	*LOSS*	*LNSTAF*	*LNTA*	*ΔGDP*	*STR*
ROA	1											
ROS	**0.534**	1										
B4	**0.148**	**-0.115**	1									
LNTOAS	-0.043	0.029	**0.189**	1								
LVG	**-0.134**	-0.041	**-0.236**	**0.115**	1							
CURR	0.042	**0.244**	**-0.102**	-0.020	-0.019	1						
ATURN	**0.269**	**-0.222**	**0.219**	**-0.184**	**0.101**	**-0.127**	1					
LOSS	**-0.419**	**-0.364**	**-0.193**	0.018	**0.182**	-0.004	**-0.150**	1				
LNSTAF	**0.105**	**-0.171**	**0.434**	**0.579**	**-0.130**	**-0.184**	**0.162**	**-0.190**	1			
LNTA	-0.032	**-0.111**	**0.088**	**0.725**	**0.172**	-0.034	-0.007	0.031	**0.505**	1		
ΔGDP	-0.011	**-0.082**	**0.083**	**0.134**	-0.060	-0.028	0.041	-0.033	**0.215**	**0.107**	1	
STR	**-0.192**	0.054	**-0.276**	**-0.147**	0.038	0.014	**-0.100**	-0.052	**-0.083**	**-0.171**	0.009	1

This table presents the correlation matrix for all variables. Panel A (panel B) presents the correlation matrix for the full (income shifting) sample. Bold values indicate significance at the two-tailed 5% level. See Appendix for variable definitions.

TABLE 4

Big 4 Affiliation and Tax Avoidance

	Size Control Only		Full Model	
	MEAS1	*MEAS2*	*MEAS1*	*MEAS2*
VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*
B4	-0.0802***	-0.1471***	-0.0336***	-0.1096***
	(0.000)	(0.000)	(0.008)	(0.000)
LNTOAS	0.0202***	0.0242***	0.0062***	0.0119***
	(0.000)	(0.000)	(0.003)	(0.000)
LVG	-	-	0.0190	0.0145
			(0.124)	(0.469)
ROA	-	-	-0.0847***	-0.0709***
			(0.000)	(0.000)
STDROA	-	-	0.0561***	0.0375***
			(0.000)	(0.006)
GROWTH	-	-	0.0413***	0.0352***
			(0.000)	(0.000)
PPE	-	-	-0.0084	-0.0389
			(0.642)	(0.216)
CURR	-	-	0.0022***	0.0009
			(0.000)	(0.193)
ATURN	-	-	-0.0244***	-0.0270***
			(0.000)	(0.000)
LOSS	-	-	0.0431***	-0.0258
			(0.000)	(0.206)
METR	-	-	0.8198***	0.7750***
			(0.000)	(0.000)
Constant	-0.5728***	-0.3291***	-0.1085***	0.1151*
	(0.000)	(0.000)	(0.007)	(0.075)
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	11,689	11,689	11,689	11,689
R-squared	0.2190	0.1406	0.2668	0.1582

This table presents the OLS regressions of the two alternative non-conforming tax avoidance measures on the Big 4 indicator and the related control variables for the period 2009-2013. Greater values of the two alternative tax avoidance measures indicate more tax avoidance The two alternative specifications differ in the number of controls included in the model. Standard errors are clustered at the firm level. P-values are in parentheses. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively. See Appendix for variable definitions.

TABLE 5

Big 4 Affiliation and Tax Avoidance - The Effect of Regulatory Scrutiny

	ENF		*BTC*	
	MEAS1	*MEAS2*	*MEAS1*	*MEAS2*
VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*
B4	0.5233***	0.6486***	0.2684***	0.2364***
	(0.000)	(0.001)	(0.000)	(0.006)
B4 X VARIABLE	-0.0617***	-0.0836***	-0.3060***	-0.3507***
	(0.000)	(0.000)	(0.000)	(0.000)
LNTOAS	0.0031	0.0093***	0.0019	0.0077***
	(0.106)	(0.001)	(0.304)	(0.004)
LVG	0.0094	0.0065	0.0125	0.0104
	(0.457)	(0.744)	(0.321)	(0.601)
ROA	-0.0791***	-0.0759***	-0.0838***	-0.0811***
	(0.000)	(0.000)	(0.000)	(0.000)
STDROA	0.0600***	0.0425***	0.0585***	0.0409***
	(0.000)	(0.001)	(0.000)	(0.002)
GROWTH	0.0445***	0.0396***	0.0437***	0.0386***
	(0.000)	(0.000)	(0.000)	(0.000)
PPE	-0.0248	-0.0564*	-0.0280	-0.0604*
	(0.163)	(0.072)	(0.116)	(0.053)
CURR	0.0019***	0.0006	0.0017***	0.0005
	(0.003)	(0.392)	(0.006)	(0.515)
ATURN	-0.0243***	-0.0264***	-0.0243***	-0.0265***
	(0.000)	(0.000)	(0.000)	(0.000)
LOSS	0.0331***	-0.0384*	0.0300***	-0.0420**
	(0.004)	(0.069)	(0.009)	(0.046)
METR	0.9535***	1.0079***	0.9749***	1.0352***
	(0.000)	(0.000)	(0.000)	(0.000)
BTC	-0.1466***	-0.1516***	-0.1002***	-0.0956***
	(0.000)	(0.000)	(0.000)	(0.001)
ENF	0.0439***	0.0443***	0.0250***	0.0201*
	(0.000)	(0.000)	(0.000)	(0.060)
STR	-0.0040**	0.0026	-0.0028*	0.0040
	(0.020)	(0.294)	(0.098)	(0.107)
LNGDP	-0.0122**	-0.0075	-0.0140**	-0.0095
	(0.041)	(0.379)	(0.017)	(0.255)
Constant	-0.0753	-0.0721	0.0585	0.1058
	(0.340)	(0.559)	(0.424)	(0.349)
Year FE	Yes	Yes	Yes	Yes
Country FE	No	No	No	No
Observations	11,689	11,689	11,689	11,689

R-squared	0.2454	0.1442	0.2479	0.1454

This table presents the OLS regressions of the two alternative non-conforming tax avoidance measures on the Big 4 indicator, controls, and the related interaction term with each of the following test variables: The mean of efficiency of the judicial system, rule of law, and corruption index in La Porta et al. (1998) *(ENF)* and the level of book-tax conformity in Atwood et al. (2010) *(BTC).* Greater values of each of these test variables indicate stronger legal institutions and more book-tax conformity, respectively. Greater values of the two alternative tax avoidance measures indicate more tax avoidance. This analysis covers the period 2009-2013. Standard errors are clustered at the firm level. P-values are in parentheses. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively. See Appendix for variable definitions.

TABLE 6

Big 4 Affiliation and Income Shifting

VARIABLES	*ROA* *(1)*	*ROS* *(2)*	*ROA* *(3)*	*ROS* *(4)*
B4	0.7954***	1.0306***	0.4835***	0.7239***
	(0.000)	(0.000)	(0.003)	(0.000)
B4 X LOSS	-	-	-0.4417**	-0.6730***
			(0.035)	(0.007)
B4 X STR	-0.0284***	-0.0367***	-0.0185***	-0.0275***
	(0.000)	(0.000)	(0.001)	(0.000)
B4 X STR X LOSS	-	-	0.0143**	0.0278***
			(0.047)	(0.001)
STR X LOSS	-	-	0.0160***	0.0031
			(0.003)	(0.655)
STR	0.0020	0.0155***	-0.0107***	0.0051
	(0.593)	(0.000)	(0.005)	(0.224)
LOSS	-	-	-0.8684***	-0.5673***
			(0.000)	(0.006)
LNTOAS	0.0005	0.0334***	0.0040	0.0385***
	(0.951)	(0.000)	(0.558)	(0.000)
LVG	-0.1577***	-0.0792**	-0.0803***	-0.0040
	(0.000)	(0.029)	(0.010)	(0.886)
CURR	0.0063***	0.0091***	0.0046***	0.0069***
	(0.000)	(0.000)	(0.000)	(0.000)
ATURN	0.0504***	-0.0127**	0.0359***	-0.0279***
	(0.000)	(0.024)	(0.000)	(0.000)
LNSTAF	0.0206***	-0.0003	0.0085*	-0.0141***
	(0.002)	(0.960)	(0.091)	(0.002)
LNTA	-0.0103**	-0.0203***	-0.0082**	-0.0169***
	(0.020)	(0.000)	(0.020)	(0.000)
ΔGDP	-0.4542	-0.0162	-0.3360	-0.1533
	(0.432)	(0.977)	(0.490)	(0.755)
Constant	0.1416	-0.3057*	0.7138***	0.1934
	(0.387)	(0.059)	(0.000)	(0.216)
Year FE	Yes	Yes	Yes	Yes
Country FE	No	No	No	No
Observations	901	923	898	917
R-squared	0.1620	0.1023	0.4364	0.4163

Columns 1 and 2 of Table 6 present the OLS regressions of return on assets *(ROA)* and return on sales *(ROS)* on the Big 4 indicator, controls, and the related interaction term with the level of statutory tax rates *(STR)*. Columns 3 and 4 further include the three-way interaction term *B4 X STR X LOSS* and the related additional control variables.This analysis covers the period 2009-2013. Standard errors are clustered at the firm level. P-values are in parentheses. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively. See Appendix for variable definitions.

TABLE 7

Big 4 Affiliation and Income Shifting - The Effect of Regulatory Scrutiny

	ENF		*BTC*	
	ROA	*ROS*	*ROA*	*ROS*
VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*
B4	-1.9116	-1.2538	-0.8737**	-0.8750**
	(0.237)	(0.353)	(0.038)	(0.024)
B4 X VARIABLE	0.2977*	0.2495*	1.0030***	1.2416***
	(0.087)	(0.090)	(0.000)	(0.000)
B4 X STR	0.1203*	0.0835	0.0405***	0.0365***
	(0.057)	(0.130)	(0.007)	(0.009)
B4 X STR X VARIABLE	-0.0162**	-0.0130**	-0.0420***	-0.0471***
	(0.017)	(0.029)	(0.000)	(0.000)
STR X VARIABLE	-0.0102**	-0.0060	-0.0359***	-0.0159
	(0.018)	(0.130)	(0.004)	(0.178)
STR	0.0972**	0.0716**	0.0426***	0.0329**
	(0.015)	(0.046)	(0.003)	(0.014)
VARIABLE	0.2836**	0.1673	1.0753***	0.4908
	(0.018)	(0.107)	(0.005)	(0.174)
LNTOAS	0.0003	0.0336***	0.0003	0.0332***
	(0.975)	(0.000)	(0.976)	(0.000)
LVG	-0.1671***	-0.0864**	-0.1592***	-0.0807**
	(0.000)	(0.020)	(0.000)	(0.027)
CURR	0.0062***	0.0091***	0.0062***	0.0090***
	(0.000)	(0.000)	(0.000)	(0.000)
ATURN	0.0533***	-0.0108*	0.0520***	-0.0121**
	(0.000)	(0.059)	(0.000)	(0.040)
LNSTAF	0.0209***	-0.0002	0.0163**	-0.0038
	(0.002)	(0.970)	(0.019)	(0.498)
LNTA	-0.0107**	-0.0206***	-0.0105**	-0.0208***
	(0.015)	(0.000)	(0.014)	(0.000)
ΔGDP	0.2529	0.5371	0.0773	0.3853
	(0.760)	(0.510)	(0.902)	(0.526)
Constant	-2.5148**	-1.8765**	-0.9984**	-0.7758*
	(0.024)	(0.043)	(0.025)	(0.066)
Year FE	Yes	Yes	Yes	Yes
Country FE	No	No	No	No
Observations	901	923	901	923
R-squared	0.1899	0.1166	0.1961	0.1176

Table 7, columns 1 and 2 (columns 3 and 4) presents the OLS regressions of return on assets *(ROA)* and return on sales *(ROS)* on the Big 4 indicator, its three-way interaction term with the country-level statutory tax rate *(STR)* and variable *ENF (BTC),* as well as the related additional control variables.This analysis covers the period 2009-2013. Standard errors are clustered at the firm level. P-values are in parentheses. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively. See Appendix for variable definitions.

TABLE 8

Big 4 Affiliation and Tax Avoidance - The Effect of Statutory Tax Rates

	STR	
	MEAS1	*MEAS2*
VARIABLES	*(1)*	*(2)*
B4	0.2622***	0.2557*
	(0.003)	(0.097)
B4 X STR	-0.0106***	-0.0131**
	(0.001)	(0.011)
LNTOAS	0.0026	0.0090***
	(0.163)	(0.001)
LVG	0.0101	0.0074
	(0.420)	(0.711)
ROA	-0.0898***	-0.0858***
	(0.000)	(0.000)
STDROA	0.1412***	0.1207***
	(0.000)	(0.000)
GROWTH	0.0431***	0.0380***
	(0.000)	(0.000)
PPE	-0.0259	-0.0587*
	(0.144)	(0.060)
CURR	0.0017***	0.0005
	(0.005)	(0.499)
ATURN	-0.0246***	-0.0266***
	(0.000)	(0.000)
LOSS	0.0304***	-0.0413*
	(0.009)	(0.052)
METR	0.9583***	1.0160***
	(0.000)	(0.000)
BTC	-0.1291***	-0.1288***
	(0.000)	(0.000)
ENF	0.0348***	0.0314***
	(0.000)	(0.002)
STR	-0.0024	0.0046*
	(0.165)	(0.065)
LNGDP	-0.0125**	-0.0081
	(0.036)	(0.339)
Constant	-0.0488	-0.0261
	(0.498)	(0.816)
Year FE	Yes	Yes
Country FE	No	No
Observations	11,689	11,689

R-squared	0.2479	0.1453

This table presents the OLS regressions of the two alternative non-conforming tax avoidance measures on the Big 4 indicator, controls, and the related interaction term with the level of statutory tax rates *(STR)*. Greater values of the two alternative tax avoidance measures indicate more tax avoidance This analysis covers the period 2009-2013. Standard errors are clustered at the firm level. P-values are in parentheses. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively. See Appendix for variable definitions.

TABLE 9

Big 4 Affiliation and Tax Avoidance - The Effect of Profitability

	ROA	
	MEAS1	*MEAS2*
VARIABLES	*(1)*	*(2)*
B4	-0.0588***	-0.1593***
	(0.001)	(0.000)
B4 X ROA	0.1570***	0.3094***
	(0.000)	(0.000)
LNTOAS	0.0064***	0.0121***
	(0.003)	(0.000)
LVG	0.0195	0.0155
	(0.115)	(0.439)
ROA	-0.0957***	-0.0926***
	(0.000)	(0.000)
STDROA	0.0547***	0.0346**
	(0.000)	(0.011)
GROWTH	0.0395***	0.0315***
	(0.000)	(0.000)
PPE	-0.0071	-0.0366
	(0.692)	(0.246)
CURR	0.0022***	0.0009
	(0.000)	(0.196)
ATURN	-0.0237***	-0.0255***
	(0.000)	(0.000)
LOSS	0.0426***	-0.0268
	(0.000)	(0.189)
METR	0.8137***	0.7630***
	(0.000)	(0.000)
Constant	-0.1116***	0.1090*
	(0.006)	(0.093)
Year FE	Yes	Yes
Country FE	Yes	Yes
Observations	11,689	11,689
R-squared	0.2676	0.1596

This table presents the OLS regressions of the two alternative non-conforming tax avoidance measures on the Big 4 indicator, controls, and the related interaction term with the level of return on assets *(ROA)*. Greater values of the two alternative tax avoidance measures indicate more tax avoidance. This analysis covers the period 2009-2013. Standard errors are clustered at the firm level. P-values are in parentheses. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively. See Appendix for variable definitions.

TABLE 10

Big 4 Affiliation and Tax Avoidance - Controlling for Statutory Auditor

VARIABLES	*MEAS1* *(1)*	*MEAS1* *(2)*	*MEAS2* *(3)*	*MEAS2* *(4)*
B4	-0.0334**	-0.0477***	-0.1167***	-0.1351***
	(0.012)	(0.000)	(0.000)	(0.000)
B4_AUD	0.0272***	0.0232***	0.0220*	0.0168
	(0.000)	(0.002)	(0.076)	(0.173)
B4 X B4_AUD	-	0.2518***	-	0.3219***
		(0.000)		(0.000)
LNTOAS	0.0097***	0.0096***	0.0167***	0.0166***
	(0.000)	(0.000)	(0.000)	(0.000)
LVG	0.0127	0.0113	-0.0069	-0.0088
	(0.428)	(0.482)	(0.780)	(0.724)
ROA	-0.0622***	-0.0669***	-0.0534**	-0.0594***
	(0.000)	(0.000)	(0.015)	(0.007)
STDROA	0.0506***	0.0512***	0.0537***	0.0546***
	(0.000)	(0.000)	(0.000)	(0.000)
GROWTH	0.0338***	0.0354***	0.0312***	0.0332***
	(0.000)	(0.000)	(0.000)	(0.000)
PPE	-0.0315	-0.0315	-0.0583	-0.0583
	(0.139)	(0.140)	(0.109)	(0.108)
CURR	0.0033***	0.0032***	0.0023**	0.0023**
	(0.000)	(0.000)	(0.012)	(0.014)
ATURN	-0.0198***	-0.0203***	-0.0257***	-0.0264***
	(0.000)	(0.000)	(0.000)	(0.000)
LOSS	0.0229*	0.0242*	-0.0330	-0.0314
	(0.077)	(0.062)	(0.135)	(0.155)
METR	0.8061***	0.8118***	0.7525***	0.7598***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.1776***	-0.1729***	0.0229	0.0289
	(0.000)	(0.000)	(0.767)	(0.709)
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	8,118	8,118	8,118	8,118
R-squared	0.2438	0.2468	0.1504	0.1528

This table presents the OLS regressions of the two alternative non-conforming tax avoidance measures on the Big 4 indicator after controling for the type of the assigned auditor *(B4_AUD).* The second specification of each measure additionally controls for the interaction of the Big 4 indicator with the corresponding auditor type *(B4 X B4_AUD).* Greater values of the two alternative tax avoidance measures indicate more tax avoidance. This analysis covers the period 2009- 2013 and is restricted to those observations with available information on the type of assigned auditor (Big 4 or non-Big 4). Standard errors are clustered at the firm level. P-values are in parentheses. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively. See Appendix for variable definitions.

TABLE 11

Panel A: Big 4 Affiliation and Tax Avoidance (PSM Specification)

	Size Control Only		Full Model	
	MEAS1	*MEAS2*	*MEAS1*	*MEAS2*
VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*
B4	-0.0922***	-0.1812***	-0.0644***	-0.1254***
	(0.000)	(0.000)	(0.001)	(0.000)
LNTOAS	0.0136**	0.0162**	0.0093	0.0094
	(0.013)	(0.047)	(0.198)	(0.311)
LVG	-	-	-0.0622	-0.0456
			(0.312)	(0.554)
ROA	-	-	-0.0541	-0.0097
			(0.410)	(0.919)
STDROA	-	-	0.0457	0.0515
			(0.140)	(0.211)
GROWTH	-	-	0.0344**	0.0341*
			(0.021)	(0.095)
PPE	-	-	-0.3928*	-0.0676
			(0.071)	(0.804)
CURR	-	-	0.0095**	-0.0005
			(0.015)	(0.911)
ATURN	-	-	-0.0121	-0.0346***
			(0.217)	(0.006)
LOSS	-	-	0.0492	0.0406
			(0.208)	(0.566)
METR	-	-	0.7439***	0.5968***
			(0.000)	(0.008)
Constant	-0.4679***	-0.2014	-0.1992	0.1040
	(0.000)	(0.164)	(0.162)	(0.558)
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	796	796	636	636
R-squared	0.2680	0.1794	0.3481	0.2653

Panel B: Big 4 Affiliation and Tax Avoidance - The Effect of Regulatory Scrutiny (PSM Specification)

	ENF		*BTC*	
	MEAS1	*MEAS2*	*MEAS1*	*MEAS2*
VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*
B4	0.5779***	0.9344**	0.2332***	0.1844
	(0.006)	(0.012)	(0.005)	(0.131)
B4 X VARIABLE	-0.0674***	-0.1153***	-0.2672***	-0.3034**
	(0.003)	(0.004)	(0.001)	(0.010)
LNTOAS	0.0105*	0.0114	0.0102*	0.0098
	(0.057)	(0.148)	(0.061)	(0.194)
LVG	-0.1846***	-0.1729*	-0.1742***	-0.1515
	(0.004)	(0.071)	(0.006)	(0.101)
ROA	0.0588	0.1366***	0.0602	0.1432***
	(0.155)	(0.003)	(0.150)	(0.002)
STDROA	0.0245	-0.0181	0.0214	-0.0191
	(0.330)	(0.525)	(0.397)	(0.503)
GROWTH	0.0309**	0.0147	0.0298**	0.0130
	(0.017)	(0.395)	(0.023)	(0.460)
PPE	-0.0841	0.0112	-0.0079	0.0992
	(0.654)	(0.966)	(0.966)	(0.702)
CURR	0.0104***	0.0091*	0.0103***	0.0089*
	(0.001)	(0.095)	(0.003)	(0.086)
ATURN	-0.0130	-0.0228*	-0.0145	-0.0246**
	(0.138)	(0.059)	(0.105)	(0.041)
LOSS	0.0752**	0.0536	0.0714*	0.0486
	(0.050)	(0.416)	(0.063)	(0.461)
METR	0.9422***	0.9006***	0.8982***	0.8657***
	(0.000)	(0.000)	(0.000)	(0.000)
BTC	-0.2612***	-0.3339***	-0.0958	-0.1277
	(0.000)	(0.000)	(0.120)	(0.143)
ENF	0.0350**	0.0633**	-0.0156	-0.0157
	(0.037)	(0.027)	(0.225)	(0.478)
STR	-0.0115***	-0.0048	-0.0108***	-0.0044
	(0.006)	(0.447)	(0.009)	(0.471)
LNGDP	0.0314*	0.0268	0.0295*	0.0260
	(0.063)	(0.301)	(0.067)	(0.308)
Constant	-0.1235	-0.1773	0.1564	0.3505
	(0.549)	(0.631)	(0.330)	(0.176)
Year FE	Yes	Yes	Yes	Yes
Country FE	No	No	No	No
Observations	826	826	826	826
R-squared	0.2838	0.1856	0.2890	0.1842

Panel C: Big 4 Affiliation and Income Shifting - (PSM Specification)

VARIABLES	*ROA* *(1)*	*ROS* *(2)*	*ROA* *(3)*	*ROS* *(4)*
B4	0.7763***	0.8362***	0.5590**	0.6116***
	(0.001)	(0.000)	(0.019)	(0.009)
B4 X LOSS	-	-	-0.6188**	-0.6855**
			(0.022)	(0.027)
B4 X STR	-0.0273***	-0.0293***	-0.0204**	-0.0224***
	(0.001)	(0.000)	(0.012)	(0.005)
B4 X STR X LOSS	-	-	0.0208**	0.0265**
			(0.026)	(0.019)
STR X LOSS	-	-	0.0114	0.0027
			(0.130)	(0.804)
STR	0.0040	0.0112**	-0.0099	-0.0008
	(0.492)	(0.046)	(0.106)	(0.903)
LOSS	-	-	-0.7520***	-0.4939*
			(0.000)	(0.083)
LNTOAS	-0.0114	0.0027	-0.0013	0.0131
	(0.439)	(0.859)	(0.914)	(0.391)
LVG	-0.2590**	-0.1482	-0.1955**	-0.1022
	(0.011)	(0.118)	(0.021)	(0.219)
CURR	0.0149*	0.0268***	0.0057	0.0182***
	(0.099)	(0.000)	(0.408)	(0.004)
ATURN	0.0555***	-0.0143	0.0374***	-0.0312***
	(0.000)	(0.150)	(0.000)	(0.006)
LNSTAF	0.0149	0.0119	0.0062	0.0043
	(0.127)	(0.152)	(0.425)	(0.551)
LNTA	0.0012	-0.0057	-0.0037	-0.0098
	(0.880)	(0.505)	(0.570)	(0.272)
ΔGDP	-0.7171	-0.5261	-0.2959	-0.3900
	(0.413)	(0.531)	(0.674)	(0.592)
Constant	0.2049	-0.0748	0.7522***	0.3768
	(0.444)	(0.764)	(0.002)	(0.151)
Year FE	Yes	Yes	Yes	Yes
Country FE	No	No	No	No
Observations	358	367	356	362
R-squared	0.1721	0.0931	0.4515	0.3426

Panel D: Big 4 Affiliation and Income Shifting- The Effect of Regulatory Scrutiny (PSM Specification)

	ENF		*BTC*	
	ROA	*ROS*	*ROA*	*ROS*
VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*
B4	-3.8109*	-2.8013*	-1.7800***	-1.5039***
	(0.071)	(0.095)	(0.005)	(0.010)
B4 X VARIABLE	0.4995**	0.3991**	1.3366***	1.3545***
	(0.030)	(0.032)	(0.000)	(0.000)
B4 X STR	0.1927**	0.1416**	0.0707***	0.0584***
	(0.022)	(0.046)	(0.002)	(0.004)
B4 X STR X VARIABLE	-0.0238***	-0.0186**	-0.0497***	-0.0489***
	(0.009)	(0.016)	(0.000)	(0.000)
STR X VARIABLE	-0.0023	0.0014	-0.0221	0.0039
	(0.746)	(0.821)	(0.255)	(0.824)
STR	0.0268	0.0009	0.0297	0.0091
	(0.672)	(0.986)	(0.168)	(0.637)
VARIABLE	0.1076	0.0108	0.6505	-0.0721
	(0.561)	(0.942)	(0.256)	(0.887)
LNTOAS	-0.0148	0.0008	-0.0124	0.0037
	(0.333)	(0.959)	(0.397)	(0.811)
LVG	-0.2636**	-0.1396	-0.2931***	-0.1526
	(0.014)	(0.163)	(0.004)	(0.116)
CURR	0.0124	0.0252***	0.0120	0.0241***
	(0.123)	(0.001)	(0.172)	(0.001)
ATURN	0.0584***	-0.0130	0.0608***	-0.0120
	(0.000)	(0.208)	(0.000)	(0.274)
LNSTAF	0.0129	0.0101	0.0055	0.0046
	(0.193)	(0.226)	(0.586)	(0.593)
LNTA	0.0018	-0.0054	0.0027	-0.0058
	(0.811)	(0.526)	(0.716)	(0.491)
ΔGDP	-0.8543	-0.9049	-0.2111	-0.3082
	(0.500)	(0.467)	(0.826)	(0.743)
Constant	-0.7547	-0.1827	-0.3997	0.0507
	(0.647)	(0.887)	(0.542)	(0.931)
Year FE	Yes	Yes	Yes	Yes
Country FE	No	No	No	No
Observations	358	367	358	367
R-squared	0.2167	0.1179	0.2267	0.1244

Panel E: Big 4 Affiliation and Tax Avoidance - The Effect of Statutory Tax Rates (PSM Specification)

	STR	
	MEAS1	*MEAS2*
VARIABLES	*(1)*	*(2)*
B4	0.3755**	0.3716
	(0.014)	(0.101)
B4 X STR	-0.0146***	-0.0174**
	(0.006)	(0.022)
LNTOAS	0.0094*	0.0090
	(0.080)	(0.220)
LVG	-0.1777***	-0.1561*
	(0.005)	(0.086)
ROA	0.0733*	0.1584***
	(0.063)	(0.001)
STDROA	0.0317	-0.0073
	(0.192)	(0.800)
GROWTH	0.0317**	0.0152
	(0.016)	(0.391)
PPE	-0.1285	-0.0406
	(0.488)	(0.877)
CURR	0.0102***	0.0088*
	(0.001)	(0.076)
ATURN	-0.0111	-0.0207*
	(0.190)	(0.076)
LOSS	0.0796**	0.0582
	(0.039)	(0.381)
METR	0.9446***	0.9169***
	(0.000)	(0.000)
BTC	-0.2137***	-0.2607***
	(0.000)	(0.002)
ENF	0.0008	0.0031
	(0.943)	(0.876)
STR	-0.0034	0.0046
	(0.530)	(0.491)
LNGDP	0.0341**	0.0313
	(0.045)	(0.232)
Constant	-0.0964	0.0428
	(0.625)	(0.891)
Year FE	Yes	Yes
Country FE	No	No
Observations	826	826
R-squared	0.2849	0.1820

Panel F: Big 4 Affiliation and Tax Avoidance - The Effect of Profitability (PSM Specification)

	ROA	
	MEAS1	*MEAS2*
VARIABLES	*(1)*	*(2)*
B4	-0.0912***	-0.1751***
	(0.001)	(0.000)
B4 X ROA	0.2202*	0.4092***
	(0.052)	(0.008)
LNTOAS	0.0077	0.0065
	(0.286)	(0.477)
LVG	-0.0566	-0.0353
	(0.354)	(0.643)
ROA	-0.1844*	-0.2518*
	(0.081)	(0.073)
STDROA	0.0414	0.0435
	(0.185)	(0.304)
GROWTH	0.0323**	0.0302
	(0.030)	(0.134)
PPE	-0.3506	0.0108
	(0.118)	(0.969)
CURR	0.0096**	-0.0004
	(0.012)	(0.938)
ATURN	-0.0100	-0.0308**
	(0.304)	(0.013)
LOSS	0.0482	0.0389
	(0.218)	(0.584)
METR	0.7327***	0.5760**
	(0.000)	(0.011)
Constant	-0.1658	0.1660
	(0.250)	(0.347)
Year FE	Yes	Yes
Country FE	Yes	Yes
Observations	636	636
R-squared	0.3514	0.2713

Panel G: Big 4 Affiliation and Tax Avoidance - Controlling for Statutory Auditor (PSM Specification)

VARIABLES	*MEAS1* *(1)*	*MEAS1* *(2)*	*MEAS2* *(3)*	*MEAS2* *(4)*
B4	-0.0334*	-0.0452**	-0.1033***	-0.1212***
	(0.059)	(0.013)	(0.000)	(0.000)
B4_AUD	0.1393**	0.0446	0.2360**	0.0935
	(0.039)	(0.544)	(0.020)	(0.239)
B4 X B4_AUD	-	0.2306**	-	0.3473***
		(0.012)		(0.009)
LNTOAS	0.0109	0.0118*	-0.0026	-0.0014
	(0.102)	(0.082)	(0.798)	(0.894)
LVG	0.0948	0.0877	0.0584	0.0476
	(0.113)	(0.139)	(0.481)	(0.566)
ROA	0.1136*	0.1380**	0.0425	0.0793
	(0.066)	(0.027)	(0.623)	(0.359)
STDROA	0.0132	0.0084	-0.0033	-0.0105
	(0.501)	(0.646)	(0.919)	(0.751)
GROWTH	0.0362**	0.0346*	0.0211	0.0187
	(0.048)	(0.059)	(0.343)	(0.408)
PPE	-0.4230	-0.4196	0.2164	0.2215
	(0.106)	(0.110)	(0.498)	(0.489)
CURR	0.0089	0.0098	0.0170*	0.0183**
	(0.223)	(0.181)	(0.058)	(0.040)
ATURN	-0.0195*	-0.0207*	-0.0240	-0.0258*
	(0.065)	(0.051)	(0.116)	(0.092)
LOSS	0.1675***	0.1542***	0.1843*	0.1643
	(0.001)	(0.001)	(0.065)	(0.100)
METR	1.0852***	1.0766***	1.2739***	1.2610***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.1870	-0.2082	0.3961*	0.3640
	(0.190)	(0.150)	(0.085)	(0.115)
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	622	622	622	622
R-squared	0.3815	0.3733	0.2445	0.2357

This table presents the propensity-score matched specifications of Tables 4 (panel A), 5 (panel B), 6 (panel C), 7 (panel D), 8 (panel E), 9 (panel F), and 10 (panel G). This analysis covers the period 2009-2013. Standard errors are clustered at the firm level. P-values are in parentheses. *, **, and *** indicate significance at the two-tailed 10%, 5%, and 1% levels, respectively. See Appendix for variable definitions.