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Abstract:

This paper tests the notion that private firms are more tax aggressive than public firms. Tax avoidance measures, e.g. effective tax rates, cannot be used to compare private and public firms when private and public firms have different levels of importance on financial accounting earnings (Hanlon and Heitzman 2010). To disentangle financial reporting incentives from tax aggressiveness, I use the fact that European groups must prepare two sets of financial statements: first, group statements (consolidated), which provide information to investors, and, second, individual statements (unconsolidated), which are used for legal purposes, but not to inform investors. Since in individual statements financial reporting incentives do not vary between public and private firms, I use these effective tax rates to compare private and public firms. My findings show that public, not private, firms are more tax aggressive, as the effective tax rates of public firms are lower in individual and group statements.

Keywords: private firms vs. public firms; tax aggressiveness; tax avoidance; individual statements.

Data Availability: Data used in this study are available from public sources identified in the paper.

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I. INTRODUCTION

The common notion in financial and tax accounting is that financial reporting of private firms is more likely to be influenced by taxation, and thus private firms are more (likely to be) tax aggressive (e.g. Ball and Shivakumar 2005; Chen, Chen, Cheng, and Shevlin 2010; Kosi and Valentincic 2012; Lin, Mills, and Zhang 2014). In line with this notion, prior literature shows that public firms have higher financial non-tax reporting costs that result in larger book-tax differences (Cloyd, Pratt, and Stock 1996; Mills and Newberry 2001). However, one cannot infer from these results that private firms are more tax aggressive, as book-tax differences cannot be used to compare firms with varying levels of importance on financial accounting earnings (Hanlon and Heitzman 2010). Larger book-tax differences could be the result of inflated financial accounting earnings or the result of tax aggressiveness. Thus, prior literature does not distinguish between tax aggressiveness and financial reporting incentives. If, for example, private firms are more tax aggressive but public firms inflate earnings, both types of firms appear to have the same effective tax rate. Summing up, prior literature does not show whether private firms are indeed more tax aggressive. Therefore, this paper empirically investigates whether private or public firms are more tax aggressive.[1]

There are various reasons to observe different levels of tax aggressiveness between private firms and public firms due to varying costs and benefits for the involved parties. Public firms could face higher costs associated with aggressive tax strategies, as they usually have a higher level of mandatory disclosure than private firms. This could lead to less tax aggressiveness, as more information increases the ability of tax authorities to detect aggressive

[1] Conceptually, I define tax aggressiveness or tax avoidance as any attempt to decrease tax obligations. This includes legal actions and actions that fall into a grey area. This definition is similarly used in prior literature (e.g. Dyreng, Hanlon, and Maydew 2008).

tax strategies (Hope, Ma, and Thomas 2013; Jacob, Rohlfing-Bastian, and Sandner 2014). Thus, public firms might be less tax aggressive than private firms. However, public firms may also have higher benefits associated with tax aggressiveness when earnings targets are based on after-tax earnings. Managers might be inclined to reach these earnings targets by using aggressive tax strategies (Dhaliwal, Gleason, and Mills 2004). Ultimately, it is an empirical question as to whether listing status shapes tax aggressiveness. To tackle this question, I exploit the fact that European groups must provide two different sets of financial reports, namely (1) individual (i.e. separate or unconsolidated) statements and (2) group (consolidated) statements.

In many European countries, *individual statements* are the starting point to determine the tax obligation, and the same tax rules apply for private and public firms. Calculating the effective tax rates based on individual statements overcomes the problem of varying levels of financial reporting incentives between public and private firms, as there is no evidence that investors use individual statements. Instead, there are multiple forms of evidence that investors do not use individual statements: (i) individual statements are not covered in earnings calls, (ii) they often cannot be found online in investor relations sections, (iii) there are no analyst forecasts based on individual statements, (iv) key indicators such as earnings per share (EPS) are based on consolidated after-tax earnings and (v) even if all individual statements of a group were available, combining them is not only very costly, but meaningless for investors without taking intercompany transactions into account.[2] Thus, I can observe effective tax rates for public and private firms, absent capital market pressure and earnings management incentives that would affect the denominator (pre-tax income) differently for public and private firms.

[2] Although I could not find any evidence that some investors use individual statements, I cannot entirely rule out this possibility. Nevertheless, capital market incentives are at least reduced to a large extent.

The sole purpose of *group statements* is to provide information, and there is no book-tax alignment. As public and private firms have different financial reporting incentives, investigating only group statements would not allow for conclusions about the difference in tax aggressiveness of public and private firms.

The analyses use two sets of data. I start with a detailed German sample, and then verify that the German results are generalizable in a broader European context. Starting with Germany is especially useful, as a unique feature of the German setting is that the effective tax rate of the individual statement of the parent captures not only the effective tax rate of the parent, but the effective tax rate of the full tax group.[3] In both samples, Germany and Europe, I compute two different effective tax rates for each company based on the individual statements of the parents and group statements.

The findings of this paper show that German (European) public firms are more tax aggressive than private firms, and the magnitude is highly significant.[4] Conditional on controlling for other factors, public firms have, on average, an effective tax rate that is 4.4 (2.4) percentage points lower in their individual statements and an effective tax rate that is 4.6 (2.0) percentage points lower in their group statements. Neglecting the costs of tax aggressiveness, this reduction translates into a reduction of approximately 0.5 percentage point return on equity per year for an average firm.

[3] Germany permits tax consolidation of domestic subsidiaries (*Organschaft*), and in order to benefit from this tax consolidation firms are required to transfer all *pre-tax* profits to the parent. The pooled profit in the individual statement of the parent is then used as a starting point to calculate the tax liability. Therefore, the individual statement of the parent captures the effective tax rate of the entire tax group.

[4] It is unlikely that firms' tax aggressiveness influences the decision to go public. Thus, endogeneity is not a concern. However, the decision to go public is a choice made by management which could potentially introduce the problem of omitted correlated variables when the determinants to go public affect tax aggressiveness. Pagano, Panetta, and Zingales (1998) show that mainly the firms' size and industry characteristics are related to the decision to go public. Thus, the models control for size and include industry fixed effects. Furthermore, I repeat all analyses with a propensity score matched subsample. The results remain qualitatively the same. Furthermore, I find that when firms carry out an IPO, the effective tax rate decreases consecutively.

The difference in effective tax rates of public versus private firms based on the group statements are in the same direction and similar magnitude as in individual statements. Furthermore, both effective tax rates are highly correlated (Pearson: 0.63). Thus, I conclude that the difference in effective tax rates between public and private firms exists not only domestically at the level of individual statements, but likely also for the whole group as indicated by group statements.

I conduct additional tests to corroborate the results. When I limit the sample to firms that carried out an IPO during the sample period, the findings show that firms become more tax aggressive after the IPO. Furthermore, the results are not influenced by different levels of conforming tax avoidance or using long-run effective tax rates over a period of 10 years.

This paper contributes to the literature by showing that the general notion that private firms are more tax aggressive seems to be premature. While prior literature found that private firms have higher book-tax differences (e.g. Cloyd et al. 1996; Mills and Newberry 2001) and are more likely to shift income across jurisdictions (Beuselinck, Deloof, and Vanstraelen 2015), the findings of this paper show that public firms, not private ones, are more tax aggressive.

The remainder of the paper is organized as follows. Section II provides details on the institutional setting, while section III reviews the literature and develops the hypotheses. Section IV reports results for the German sample, and section V for the European sample. Section VI provides corroborating results, and section VII offers conclusions.

II. INSTITUTIONAL SETTING

This section provides detailed information on the institutional setting in Germany. Germany is especially useful when investigating the differences between private and public firms, as the tax rules are the same for both private and public firms. Furthermore, as described below in more detail, a unique feature of Germany is that the effective tax rate computed based

on the individual statement of the parent captures not only the effective tax rate of the parent's income, but also the entire tax group in Germany (i.e. including the income of all domestic subsidiaries).

Individual and group accounts in Germany

Traditionally, Germany has a high book-tax alignment (Pfaff and Schröer 1996). Nevertheless, some researchers find that Germany has low book-tax conformity (e.g. Atwood, Drake, and Myers 2012; Tang 2014). This finding is not surprising, as those researchers mostly use group (consolidated) statements from commercial databases (e.g. Compustat, Worldscope). The only purpose of group statements is to provide information, for example to capital market participants. Thus, there is no direct link between group statements and tax payments – which is acknowledged by the above-mentioned researchers in their footnotes.

Panel A of Table 1 summarizes the institutional differences between individual and group statements for private and public firms in Germany. Individual financial statements follow German accounting rules and must be prepared for the parent company and for every subsidiary of the group separately. The requirement to prepare individual statements is based on legal form, not listing status, and both public and private firms are required to prepare their individual financial statements in accordance with German GAAP. There are no differences between private and public firms.

The sole purpose of group statements is to provide information, and there is no book-tax alignment. Similar to individual statements, the requirement to prepare group statements is based on legal form. Nevertheless, the so-called IAS regulation (European Parliament 2002) has required publicly listed firms in EU regulated markets to prepare their consolidated financial statements in accordance with International Financial Reporting Standards (IFRS) since 2005.

Private firms in Germany may choose between German GAAP and IFRS for their consolidated financial statements.

Effective tax rates of individual and group accounts

Panel B of Table 1 summarizes the differences between the effective tax rates of individual statements and group statements for private and public firms. Like other European countries, Germany uses tax consolidation of the parent company and controlled domestic subsidiaries (*Organschaft*). A special feature in the German context is that firms are allowed to consolidate their taxable income only when they also pool their profits in the individual financial statements. Therefore, German subsidiaries transfer their *pre-tax* profit directly to the parent where the profit is taxed. The parent company covers losses incurred by the subsidiaries accordingly. The individual statement of the parent company is then used as the starting point to determine the tax liability of the whole tax group. Thus, the effective tax rate of the parent's individual statement captures the tax rate of the parent company and all domestic subsidiaries,[5] i.e. the full domestic operations of the group (Appendix A gives a simplified numerical example of how effective tax rates of individual and group statements are calculated).

Similar to the institutional setting in Panel A, there are no differences between the effective tax rates of private firms and public firms. Thus, this setting allows me to compare the effective tax rates of public and private firms mainly for three reasons. First, both public and private firms must follow the same accounting rules (German GAAP). Second, there is no need

[5] From a group perspective, it is tax beneficial to form a tax group where all German subsidiaries transfer their *pre-tax* profit directly to the parent where the profit is taxed. Oestreicher and Koch (2010) show that firms entered into a tax group especially after the introduction of the territorial system in 2001. It is unlikely that German subsidiaries pay dividends (after tax) to the parent company, as the profit would partly be taxed twice – first, at the level of the subsidiary and second, 5% of the dividend income of the parent company would be taxed at the statutory tax rate. Thus, German firms should have transfers of profits and losses to the parent company, and all profits are taxed at the level of the parent company.

to estimate the extent to which the effective tax rate is influence by foreign income. Third, and more importantly, there is no evidence that capital market participants use individual statements. Thus, there are no differences in the importance of financial accounting earnings, and it is suitable to compare the effective tax rates of public and private firms.

In contrast to individual statements, group statements are differently affected by financial reporting incentives between private and public firms (*capital market incentives*). The effective tax rate of group statements captures three different parts, namely the effective tax rate on domestic income, the effective tax rate on foreign income and financial reporting incentives.

Insert Table 1 here

III. LITERATURE AND HYPOTHESIS DEVELOPMENT

To date, little research has been conducted in the context of private firms or as regards the differences between private and public firms. Among the first to study the differences between private and public firms were Penno and Simon (1986). Using a questionnaire, they find that publicly-traded firms are more likely to use income-increasing accounting methods. A similar finding is shown by Beatty and Harris (1998), who find that publicly listed banks engage in more earnings management than private banks. In contrast, Burgstahler, Hail, and Leuz (2006) find that private firms engage more in earnings management. This effect is increased in countries with stronger tax alignment for private firms, but not for public firms. Coppens and Peek (2005) find that in the absence of capital markets, European private firms avoid reporting small losses in countries with low book-tax alignment. Ball and Shivakumar (2005) find that earnings of UK private firms show less timely loss recognition than public firms. Similarly, Peek, Cuijpers, and Buijink (2010) show that shareholders of private firms demand less symmetric timeliness than shareholders of public firms.

Most studies related to taxation, study differences in book-tax differences between private and public firms. Cloyd et al. (1996) show that public firms have higher financial non-tax reporting costs that result in larger book-tax differences. Mills and Newberry (2001) confirm the survey results of Cloyd et al. (1996) with actual tax return data. Klassen (1997) uses inside ownership concentration as a proxy for reduced capital market pressure. His findings are consistent with the idea that managers of closely held firms are better able to signal their ability through direct communications, and thus have lower pressure to use income-increasing accounting choices.

Prior literature that examined differences between public and private firms has looked into differences in income shifting. Lin et al. (2014) show that private firms shift income more from a high- to a low-tax year in response to a local tax rate change in China. Beuselinck et al. (2015) find that European multinationals shift income from high- to low-tax countries, and the effect is more pronounced for private firms. Although these findings indicate that private firms are more tax aggressive, income shifting is only one mechanism to reduce the tax burden. Tax strategies might be systematically different between private and public firms, as profit shifting currently receives much (negative) media attention, and public firms are more likely to be covered in the financial press. Thus, public firms potentially face higher costs associated with income shifting and, consequently, use alternative mechanisms (for example aggressive tax strategies within countries) to reduce their tax burdens.

Chen et al. (2010) raise the question as to whether family firms are more tax aggressive than non-family firms. Their main finding is that family firms have higher effective tax rates and thus are considered less tax aggressive. Chen et al. (2010) attribute this finding to reputational

concerns of family owners. Furthermore, family owners are often under-diversified and are thus more vulnerable if tax enforcement actions take place.

A recent working paper by Badertscher, Katz, Rego, and Wilson (2016) proposes a new measure of conforming tax avoidance and shows, among other validation tests, that public firms engage less in conforming tax avoidance strategies. However, as the authors acknowledge, their measure can potentially be biased when firms engage in decreasing earnings management (e.g. smoothing or earnings baths). This is especially problematic if earnings management incentives differ, for example between private and public firms.

Generally, the decision to engage in aggressive tax strategies depends on the costs and benefits for the involved parties. Tax savings lead to rent extraction for shareholders and to higher salaries/bonuses for managers if they are incentivized accordingly. Whereas the benefits are obvious, the costs of tax avoidance can be direct or indirect. Direct costs are, for example, the costs of establishing complex tax structures within the group, as well as payments for tax advisors. Indirect costs are, for example, the increased likelihood of sanctions from the tax authorities and reputational costs. Thus, when managers trade off the costs and benefits, they have to incorporate multiple layers, and costs and benefits of tax aggressiveness could be different between public and private firms.

Aggressive tax strategies could be more costly for public firms for several reasons. Public firms are required to disclose more information about, e.g. earnings, than private firms. This in turn helps the tax authority to detect aggressive tax strategies, and public firms would be less likely to engage in aggressive tax planning than private firms. Mandatory disclosure is used in a model by Jacob et al. (2014) that aims at providing a theoretical background to explain cross-sectional differences in tax avoidance. The decision to engage in tax avoidance in a principal-

agent setting depends on the costs and benefits associated with tax avoidance. Tax planning costs are increased for public firms due to the higher amount of disclosure. Their assumptions are in line with the results of Hope et al. (2013). The authors find that disclosure of regional earnings distribution is associated with lower worldwide effective tax rates. In particular, Hope et al. (2013) investigate the effects of the 1998 implementation of SFAS 131 which made geographic disclosures no longer mandatory.

Furthermore, aggressive tax strategies increase book-tax differences. When investors are not able to distinguish whether high book-tax differences are the result of inflated earnings or tax strategies, large book-tax differences are considered a "red flag" to investors and enforcement agencies (Erickson, Hanlon, and Maydew 2004; Hanlon 2005). Overall, a higher level of disclosure and costs associated with high book-tax differences of public firms are potentially associated with less tax aggressiveness and thus higher effective tax rates.

However, capital market participants could also incentivize managers of public firms to be more tax aggressive than private firms. It might be that capital market participants require public firms to engage in aggressive tax strategies, as competition on equity markets pressures managers to be more profitable. Bhojraj and Libby (2005) show that when managers are faced with high capital market pressure, managers behave more myopically when they report quarterly compared to semi-annually. Managers might be inclined to reach these earnings targets with aggressive tax strategies. Dhaliwal et al. (2004) find that firms decrease their effective tax rate in the fourth quarter in order to meet or beat the consensus analysts forecast. Thus, whether public firms or private firms are more tax aggressive is an open question, and I state the hypothesis in the null as follows.

H: There is no difference in tax aggressiveness between private firms and public firms.

IV. EFFECTIVE TAX RATES IN GERMANY

Sample

The data are gathered from the Hoppenstedt and Orbis databases and consist of a set of individual statements of parent companies (unconsolidated) and a set of the respective group statements (consolidated). Thus, the sample does not include stand-alone firms. Both datasets are merged based on the Hoppenstedt identifier (Hoppensted ID). In order to calculate effective tax rates, observations with negative pre-tax income in the group statement or individual statement are deleted. Furthermore, I require observations to have data on all control variables, including ownership data from the Orbis database, and the sample does not include banks and insurance companies.

The sample period is from 2001 to 2009. In 2001, a classical territorial corporate tax system was introduced which changed the taxation of corporate dividends. In 2010, Germany changed its local GAAP drastically (Accounting Law Modernization Act) and the book-tax conformity was reduced. The final sample consists of two times 3,299 firm-year observations (individual statements and group statements). Of these, 2,219 observations are from private firms and 1,080 observations from public firms.[6]

Research design individual statements

As mentioned, individual statements are the starting point for the tax return. Nevertheless, some adjustments are made afterwards. In Germany, only five percent of the dividends are subject to taxation. Furthermore, depreciation of shares in affiliated companies is

[6] Unfortunately, tax loss carry-forwards are not observable. If tax loss carry-forwards are equally distributed between public and private firms, tax loss carry-forwards would not affect the difference between the two groups. In untabulated results, I require firms to have more than one consecutive profitable year, and delete the first year from the sample. The idea is that tax loss carry-forwards are already offset in the first year (or at least partly) and thus do not affect the effective tax rate calculations in further years. The results do not change qualitatively.

not tax-deductible. To really capture the effective tax rate (*ETR*), pre-tax income is adjusted accordingly.[7] The effective tax rate is then computed as income tax deflated by adjusted pre-tax income.[8] As the calculation of *ETR* does not include deferred taxes, any differences between private and public firms consist of permanent differences.[9]

$$\begin{aligned} PRETAX = {} & \text{Net Income} + \text{Total Tax} - (\text{Dividends} * 0.95) \\ & + \text{Depreciation of Other Financial Assets} \end{aligned} \tag{1}$$

$$ETR = \text{Income Tax} / PRETAX \tag{2}$$

If the effective tax rate were just the statutory tax rate multiplied by the pre-tax income, we would observe that all firms have exactly the same effective tax rate. However, in reality, we observe significant differences in the cross-section of firms. The effective tax rate is different from the statutory tax rate, as there are tax exempt revenues and non-tax deductible costs. Furthermore, the German legislature allows leeway in recognition and subsequent valuation of assets and liabilities (e.g. accelerated depreciation schedules) which influence the effective tax rate. Another way to reduce the tax burden in Germany is to strategically optimize the location of operations, as each municipality levies a local business tax. Generally, the tax strategies are not observable. However, there are multiple items of evidence, apart from the observed cross-sectional differences in effective tax rates, that firms seek to reduce their tax burden. In Germany, for example, 2.4% of all firms in 2014 where subject to tax enforcement actions, and firms had to pay an additional 17.9 billion euro in taxes (German Federal Ministry of Finance 2015).

[7] This depreciation is contained in the position "Depreciation of other Financial Assets". I cannot rule out that other deprecation is captured within this position.
[8] I cannot use a cash-tax-based avoidance measure, as German GAAP does not require the publication of a cash flow statement.
[9] However, if the tax rate is defined as income tax *plus* deferred tax deflated by adjusted pre-tax income, the results remain constant.

The analyses use OLS regression design. The dependent variable is the effective tax rate (*ETR*) and the main variable of interest is *PUBLIC*, which is coded one if the respective firm is publicly listed and zero otherwise. In line with Chen et al. (2010), I include the variable *FAMILY*, which is coded one if the majority of the shares[10] are owned by families. Ownership data are based on the last available data in the Orbis Database, and are thus time-invariant. However, family ownership is usually long-term investments, as family owners are often the founders or founding family of a company.

$$ETR_{i,t} = \beta_0 + \beta_1 * PUBLIC_{t} + \beta_2 * ROA_{i,t} + \beta_3 * DEBT_{i,t} + \beta_4 * PPE_{i,t} + \beta_5 * INTANG_{i,t} + \beta_6 * SIZE_{i,t} + \beta_7 * FAMILY + \beta_8 * STATE + FE_{i,t} + \varepsilon \quad (3)$$

The subscript "i" indicates that data from individual statements are used. If there is no subscript "i", this means that the variable is the same for individual and group statements (e.g. *PUBLIC*). Control variables are mostly in line with prior literature (e.g. Chen et al. 2010). I control for profitability and include return on assets (*ROA*). Leverage (*DEBT*) is defined as debt over total assets. *PPE* is property, plant and equipment divided by total assets. Intangible assets (*INTANG*) is defined as intangible assets deflated by total assets. Tax planning activities incur fixed costs, and bigger firms are more likely to have the funds to engage in aggressive tax planning. Therefore, *SIZE* is the natural logarithm of total assets. I do not include a market-based measure for size or the market-to-book ratio, as the required data are not available for private firms. Similar to *FAMILY*, *STATE* is coded one if the majority of the shares is owned by either

[10] The majority of the available shares in the Orbis dataset. On average, information on approximately 70% of the shares is available for the sample.

the federal republic, the 16 federal states or any municipality.[11] Fixed effects are included for time (year), industry and legal form[12] when indicated.

The models for the individual statements do not explicitly control for foreign operations or subsidiaries in, for example, tax havens. When firms shift profits from Germany to a tax haven, the profit would be taxed in the foreign subsidiary. Therefore, profit shifting across countries to reduce the tax burden would affect the effective tax rate of only the group statement, but not the individual statement. This setting circumvents the problem of estimating the extent to which foreign operations are due to operational decisions, due to tax minimization or both.

Research design group statements

The research design for the group statements is similar to that for individual statements. Effective tax rates and most control variables are calculated in the same way, the only difference being that now data from group statements are used instead of data from individual statements (indicated by the subscript "g"). In contrast to the effective tax rates of individual statements, effective tax rates of group statements are affected by the geographical structure of the group. Therefore, the empirical tests for the group statements additionally include *#SUBS*, which is the number of subsidiaries and fixed effects for each foreign country where the subsidiaries are located ($FE_{g,SUBS}$). If, for example, a group has a subsidiary in France and Italy, both fixed effects would take on the value of one. Therefore, I control for the influence of foreign income on effective tax rates of groups and opportunities for profit shifting. Both the number of subsidiaries and the respective countries are time-invariant data from the Orbis database.

[11] State ownership in Germany is mostly present in the distribution of gas and electricity, and rarely in public firms (*see* Table 2). The only publicly listed firms that are currently majority owned, directly or indirectly, by the federal state/states/municipalities are Deutsche Bahn AG, Deutsche Post AG and Fraport AG (Frankfurt Airport).
[12] *Aktiengesellschaft* (stock company, corporation) or *Gesellschaft mit beschränkter Haftung* (limited liability company). Both forms feature limited liability.

Furthermore, the model includes a binary variable *IFRS*, which is coded one if the group adopted the International Financial Reporting Standards for its consolidated statement.

$$\begin{aligned} ETR_{g,t} = {} & \beta_0 + \beta_1 * PUBLIC_{t} + \beta_2 * ROA_{g,t} + \beta_3 * DEBT_{g,t} + \beta_4 * PPE_{g,t} + \\ & \beta_5 * INTANG_{g,t} + \beta_6 * SIZE_{g,t} + \beta_7 * FAMILY + \beta_8 * STATE + \\ & \beta_9 * \#SUBS_{g} + \beta_{10} * IFRS_{g,t} + FE_{g,SUBS} + FE_{g,t} + \varepsilon \end{aligned} \quad (4)$$

Findings: Germany

Table 2 displays the descriptive statistics for the individual statements and group statements separately for private firms and public firms. Panel *A* and Panel *B* provide descriptive statistics for the *individual* statements for private firms (Panel *A*) and public firms (Panel *B*). Similarly, Panel *C* and Panel *D* provide descriptive statistics for the *group* statements for private firms (Panel *C*) and public firms (Panel *D*).

The table shows that the effective tax rates of public firms are lower than those of private firms. Within the individual (group) statements, the average effective tax rate of private firms is 31.0% (32.6%) and the average effective tax rate of public firms is 27.2% (29.4%). Untabulated t-tests show that the differences are statistically significant. Similarly, the median effective tax rate of public firms is lower in both samples. These univariate comparisons indicate that public firms are more tax aggressive than private firms.

In both samples, private firms are less profitable, have more PPE, are smaller and have less intangible assets than public firms. Group statements in accordance with International Financial Reporting Standards are prepared by 10.4% of the private firms and 76.4% of the public firms. Approximately the same proportion of private firms (16.0%) and public firms (16.4%) are majority owned by families (*FAMILY*).

Only 1.7% of the public firms are owned by the state, whereas 18.2% of the private firms are majority state owned (*STATE*). The high ratio of state owned private firms is probably explained by the higher number of gas and electricity distributers in Germany (Pierk and Weil 2016) which are mostly required by EU regulation to be organized as a group (European Parliament 2003) and are mostly wholly owned by the respective municipality where they are located. On average, public firms have more subsidiaries (159 vs. 93) and these subsidiaries are located in more different countries (11.3 vs. 3.2).

Insert Table 2 here

Table 3 provides Pearson correlations for the individual statements below the diagonal and Pearson correlations for the group statements above the diagonal. *PUBLIC* and *ETR* are negatively and significantly correlated within both samples. *FAMILY* and *ETR* are positively and statistically significantly correlated. Based on these univariate tests and in contrast to the common notion that private firms are more tax aggressive, I find that, in fact, public firms are more tax aggressive. Furthermore, the results for *FAMILY* are in line with the findings of Chen et al. (2010) that family firms are less tax aggressive.

ETR is negatively correlated with *ROA* and *PPE*. Within the group statements, *IFRS* is negatively correlated with *ETR*. Furthermore, the effective tax rates of the individual statements and the group statements are highly correlated (Pearson: 0.63, not tabulated). The correlation is stronger among private firms (Pearson: 0.69, not tabulated) than among public firms (Pearson: 0.46, not tabulated). The difference could be explained by higher financial reporting incentives of public firms in the group statements.

Insert Table 3 here

The multivariate results test the predictions separately for individual statements and for group statements. The dependent variable is the effective tax rate (*ETR*). Standard errors are clustered at firm level. Model 1 to Model 4 of Table 4 provide the results for the individual statements. First, the results show the univariate association between *ETR* and *PUBLIC* (Model 1), then fixed effects are included (Model 2) and Model 3 controls for other determinants of tax aggressiveness. Across all models, the coefficient of *PUBLIC* is negative and highly significant. The coefficient of -0.044 means (Model 3) that the effective tax rate of public firms is 4.4 percentage points lower than that of private firms. The coefficient of *FAMILY* is positive, and the magnitude and the level of significance is lower than the coefficient of *PUBLIC*. However, the 2.3 percentage points difference between family and non-family firms (Model 3) is economically significant. The control variables show that more profitable firms (*ROA*), firms with more PPE (*PPE*), and bigger firms (*SIZE*) have lower effective tax rates.

As linear regressions make strong assumptions about linearity, Model 4 uses a subsample based on a propensity score matching. The first stage thereby estimates the likelihood of being public. Each public firm is then matched with a private firm based on the propensity of being publicly listed (nearest neighbour matching with a caliper of 5% and no replacement). The sample is reduced to 541 public firm-year observations and 541 private firm-year observations. The coefficient of *PUBLIC* does not change and the coefficient of *FAMILY* increases to 7.0. The very high coefficient of *FAMILY* could potentially be affected by the low number of family-owned firms in the matched sample.

Models 5 to 9 repeat the analyses using data from the group statements. Model 8 includes the respective propensity score matched results for the group statements. Here, the sample size is reduced to 352 public firm-year observations and 352 private firm-year observations. The

coefficients of *PUBLIC* are negative and statistically significant across all models. Control variables show qualitatively the same results. Furthermore, Model 7 shows that firms using International Financial Reporting Standards have lower effective tax rates. This could be due to either self-selection of tax aggressive firms into IFRS adopters or the inflation of earnings by IFRS. This in turn increases the denominator of the effective tax rate measure and leads to lower effective tax rates.

To rule out that different GAAP systems bias the results, the last model "No IFRS" limits the sample to consolidated firms that did not adopt International Financial Reporting Standards. There are two main reasons why German publicly listed firms in the EU are not using IFRS after 1 January 2005. First, some firms were allowed to postpone IFRS introduction by two years (e.g. firms which were cross-listed in the United States and which prepared their consolidated financial statements in accordance with US GAAP). Second, firms listed on exchange-regulated stock exchanges (e.g. the Entry Standard of the Frankfurt Stock Exchange) are not required to use IFRS and may still choose between the two GAAP systems (European Parliament 2002, article 4). The results show that the coefficient is negative (-0.094) and statistically significant. This difference between public and private firms in Model 9 (No IFRS) seems to be very high. However, firms listed on exchange-regulated markets are usually young and only recently went public, as the Entry Standard of the Frankfurt Stock Exchange was instituted only in 2005. Thus, these firms are more likely to be in the early stage of the life cycle and, consequently, might have a higher likelihood of having losses and tax loss carry-forwards which negatively affect the effective tax rate.

In a nutshell, Table 4 suggests that public firms are more tax aggressive. The effective tax rates of public firms are between 4.4 percentage points (Model 3) and 4.6 percentage points

(Model 7) lower than those of private firms. Thus, the direction and magnitude of the results are very similar for individual statements and group statements. Furthermore, as stated, the effective tax rates are highly correlated between individual statements and group statements. I conclude that public firms are more tax aggressive, not only domestically at the level of individual statements but also for the entire group as shown by group statements.

Insert Table 4 here

V. EFFECTIVE TAX RATES IN EUROPE

Institutional setting

This section addresses the question as to whether the results of the detailed German analyses are generalizable to other countries. Table 5 provides a brief overview of the different tax and financial accounting regimes of the European sample. Panel *A* of Table 5 indicates that in all countries but Belgium, tax consolidation is allowed at least under some circumstances. Although almost all countries officially levy tax on worldwide income, all countries exempt between 95% and 100% of foreign dividends/income when certain conditions are met. Tax loss carry-forward periods vary among countries and range between 10 years and infinity. France, Germany and Norway allow firms to carry back losses, but the carry-back amount is limited. The tax rules are the same for public and private firms, and thus allow for comparisons between public and private firms.

All countries of the sample adopted, in line with the so-called IAS regulation, the International Financial Reporting Standards for the consolidated statements of listed companies. It is a Member State option to permit, prohibit or require the International Financial Reporting Standards for unlisted firms and for individual statements. Panel *B* of Table 5 shows that all countries of the sample permit International Financial Reporting Standards for consolidated

statements of unlisted firms. Most countries require national accounting standards for individual statements. Finland and Norway permit the application of International Financial Reporting Standards for individual statements of unlisted firms and listed firms, while Italy permits their application for unlisted firms and requires their application for listed firms.

Insert Table 5 here

Sample and research design

In the European sample, I use European individual and group statements from the Orbis database. The first search criterion was the consolidation code "C2/U2 (companies with both types of accounts)" to ensure that both the individual and group statements were available. Next, data on individual statements and group statements were downloaded separately and merged based on the Bureau van Dijk identifier. The sample period covers all available data from 2005 to 2014. Due to data availability and further restrictions, (for example not every country has a sophisticated stock market), I limit the sample to eight European countries (Belgium, Germany, Finland, France, Italy, Norway, Spain and Sweden) and delete banks, insurance companies and non-profit organizations.[13] In order to compute effective tax rates, the sample contains only firm-year observations with positive pre-tax income. In total, the sample contains 46,530 firm-year observations.

The analyses are mainly the same as in the German sample. The dependent variable is *ETR* and the main variable of interest is *PUBLIC*, which is coded one if the respective firm is publicly listed and zero otherwise. The only difference is that *PRETAX* is not adjusted in the

[13] Countries are included if at least 30 firm-year observations of private firms and 30 firm-year observations of public firms are available. In some countries, matching the individual statements of the parent with the group statement led to an insufficient number of observations, e.g. the Netherlands and the United Kingdom.

European sample. Model 3 is used for individual statements and Model 4 is used for group statements.

Findings: Europe

Table 6 provides the descriptive statistics separately for private and public firms, and for individual and group statements. Panel *A* and Panel *B* show that the effective tax rate of public firms (Panel *B*, 23.2%) is lower than the effective tax rate of private firms (Panel *A*, 27.1%) in the individual statements. Similar results can be found for the effective tax rates of group statements. The effective tax rate of public firms is 30.3% and of private firms is 32.9%. This offers initial evidence that the public firms are also more tax aggressive across the European sample.

Panel *E* of Table 6 shows the average effective tax rate for each country. In five out of eight countries (Belgium, Finland, Germany, Italy and Spain), the effective tax rate of public firms is statistically significantly lower than that of private firms, within both the individual statements and the consolidated statements. For Sweden, the effect can be found only within the group statements. Only in France and Norway are public firms not more tax aggressive than private firms.

Insert Table 6 here

Table 7 provides the multivariate regression results for the European sample for individual statements. The first column "All" includes observations from all European countries in the sample. The model uses country, time and industry fixed effects, and standard errors are clustered at country level.[14] The models for Spain (ES) and Norway (NO) do not include the

[14] The results remain statistically significant when clustering standard errors at firm level.

interaction term of *PUBLIC* and *FAMILY*, as there is no intersection of the two variables in the sample of these two countries. The country-level regressions of the Norway, Finland and Italy do not control for International Financial Reporting Standards, although these countries permit International Financial Reporting Standard for individual statements. The database reports "Local GAAP" for all firms in the Norwegian and Finish sample. Thus, I cannot include the respective control. Untabulated results show that controlling for IFRS in the Italian sample does not change the coefficient of *PUBLIC*.

In line with the German sample, public firms have, on average, a 2.4 percentage point lower effective tax rate than private firms. Size and profitability (*ROA*) are negatively associated with effective tax rates. The next models investigate the research question separately for each country. In five out of eight countries, public firms have statistically significantly lower effective tax rates than private firms (Belgium, Finland, Germany, Italy and Spain). In the remaining three countries (France, Norway and Sweden), the coefficients of *PUBLIC* do not show statistical significance.

Insert Table 7 here

Table 8 reports the European analyses for the group statements. The country-level regressions of the Scandinavian countries (Finland, Norway and Sweden) do not control for International Financial Reporting Standards. The database reports "Local GAAP" for all firms. However, at least the publicly listed firms of the sample are required to use International Financial Reporting Standards. Public firms have a statistically significantly lower effective tax rate with approximately the same magnitude (2.0 percentage points). In all but one country (France) the coefficient of *PUBLIC* is negative, and in four countries it is statistically significant.

Overall, the effect is similar to the individual statements, and public firms have lower effective tax rates and are thus considered as more tax aggressive.

Insert Table 8 here

VI. CORROBORATING RESULTS

Conforming tax avoidance

Measures of tax avoidance (e.g. effective tax rates or book-tax differences) generally provide information about non-conforming tax avoidance, but not about conforming tax avoidance. However, prior literature shows that firms also engage in conforming tax strategies (e.g. Guenther 1994, Maydew 1997). In my setting, using individual statements, both types of firms have the same opportunities to engage in non-conforming and conforming tax avoidance, as capital market participants do not use individual statements. Given this setting, to the best of my knowledge, there is no rationale as to why public firms are more tax aggressive when using non-conforming tax strategies but not more tax aggressive when using conforming tax strategies.

Nevertheless, I use tax expense deflated by lagged total assets as a proxy that captures both conforming and non-conforming tax avoidance.[15] The upside of using this measure is that the denominator is not influenced by current year's earnings management or conforming tax strategies. The downside is that this measure assumes that public and private firms have a similar asset structure that generates similar taxable profits. Furthermore, if public firms smooth earnings more or take earnings big baths more often, this would influence the amount of taxes paid, and in this case private and public firms are hardly comparable. However, if I still find the effect that public firms are more tax aggressive, this indicates that the results are robust to

[15] The measure is motivated by Badertscher et al. (2016), who use the ratio of cash taxes paid to lagged total assets. However, cash taxes paid is not available in a European setting.

conforming tax strategies and at the same time justifies the use of such tax avoidance measures. For a more detailed discussion of conforming and non-conforming tax avoidance, *see* Badertscher et al. (2016).

Panel *A* of Table 9 provides the results of the individual statement, and Panel *B* the results of the group statements. The number of observations is reduced in both samples, as the dependent variable is deflated by lagged total assets and is not available for all firm-years. In both samples I still find that public firms are more tax aggressive, as the coefficients of *PUBLIC* is negative and statistically significant in both samples (columns "All"). The country-by-country analyses show that the effect can be found in some countries, but not all. Nevertheless, based on the rationale that there is no theoretical argument as to why we would expect to find different results for a joint measure of conforming and non-conforming tax aggressiveness, and based on the findings of Table 9, I conclude that public firms are more tax aggressive.

Insert Table 9 here

IPOs in Europe

In this section, I limit the sample to firms that carried out an IPO within the sample period. This allows me to investigate whether there is a change after the IPO in tax aggressiveness. The sample contains 520 firm-year observations of 99 unique firms that carried out an IPO where I have at least one observation in the pre-IPO period and one in the post-IPO period. The analyses include firm fixed effects to control for time-invariant characteristics. Furthermore, year fixed effects control for time effects (e.g. changes in statutory tax rates). As the IPO dates are not clustered in time, I do not include a control sample. Thus, I test whether changing the listing status from "not listed" to "publicly listed" has an effect on tax aggressiveness.

Table 10 contains the respective regression results. Model 1 and Model 2 are based on individual statements, and Model 3 and Model 4 are based on group statements. As all models include firm fixed-effects, all time invariant variables are not used (e.g. *FAMILY*, *PUBLIC*, *#SUBS*). The results show that firms have lower effective tax rates after an IPO. The coefficient of -0.033 in Model 1, for instance, can be interpreted as a 3.3 percentage point reduction in the effective tax rate after the IPO. The effect remains qualitatively the same when including time and firm fixed effects for both the individual and group statements. In Model 2 and Model 4, the coefficients are only close to statistical significance (P-Values 10.2 and 14.1, respectively) but the economic effect is similar. Table 10 indicates that when firms carry out an IPO, they are more tax aggressive afterwards.

Insert Table 10 here

Long-run effective tax rate

The sample so far does not contain firms with negative pre-tax income. This selection could potentially affect the results if losses, and thus tax loss offsetting, is not equally distributed among private and public firms. As effective tax rates of firm-years with negative pre-tax income are not meaningful, I cannot include them in my sample. However, it is reasonable to compute long-run effective tax rates over several years and exclude firms only where the sum of the pre-tax income is negative. This has several advantages. First, the sample selection problem is reduced, as firm-years with negative pre-tax income are included. Second, this approach reduces the problem of tax loss offsetting. And third, Dyreng et al. (2008) show that annual effective tax rates are not necessarily predictive for the long-run tax avoidance strategy.

In Table 11, the dependent variable is the average effective tax rate. I include only firms with data on the full sample period of 10 years (including loss years). This sample period ensures

that the average effective tax rates are computed using the same years and thus the same statutory tax rates. Otherwise it could be problematic if, for example, public firms are more likely to have data on the full sample period, but data on private firms are more likely to be available in later years where the statutory tax rates are lower. The previous analyses controlled for this using time fixed effects. This is not possible in the long-run analyses, as only one observation per firm is included. In total, the analyses include 1,764 unique firms.

In line with Gallemore and Labro (2015), I include the average of the control variables over time. Model 1 (Model 4) includes only the main variable of interest, *PUBLIC*, and the results show a significantly negative coefficient of -0.038 (-0.044). When including fixed effects and control variables, the coefficient becomes less negative and amounts to -0.022 and -0.031 (Model 5 and Model 6).

Insert Table 11 here

VII. CONCLUSION

The common notion is that private firms are more tax aggressive, as they face lower non-tax costs of financial reporting. In contrast, this paper provides evidence that public firms, not private firms, are more tax aggressive. The results can be found within individual and group statements. Furthermore, I find the mentioned effect in a detailed analysis using German data and confirm the generalizability of the results in other European countries. However, there seem to be differences between countries, as in some countries the effect is absent. Thus, future research may identify reasons for these cross-country differences. Nevertheless, the common notion that private firms are more tax aggressive seems to be premature.

The differences in effective tax rates between public and private are highly significant. However, I cannot observe the costs associated with tax aggressiveness. Thus, the benefit of, for

example, a 4 percentage point reduction in the effective tax rates must be evaluated against the costs of tax planning, assuming that companies choose their optimal level of tax planning activities. However, the differences are still very important and should be interesting for investors in evaluating benefits and risks associated with the respective investment, and for policy makers in planning enforcement activities.

A caveat of this paper is that public firms are defined by being listed on equity markets. Thus, I do not control for the existence of public debt in the sample of private firms. However, in most European countries – and in Germany in particular – it is not common that firms with non-listed equity engage in public debt markets. Instead, private firms use a close relationship with banks or even only one specific (house) bank (Harhoff and Körting 1998).

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Appendix A: Example of calculating effective tax rates in Germany

Panel A: Assumptions

	Parent	Subsidiary 1: DE	Subsidiary 2: ES
Location	Germany	Germany	Spain
Statutory tax rate	30%	30%	20%
Pre-tax profit	100	100	100
Payout to parent		Direct transfer (before tax)	Dividend payout to P (after tax)

Panel B: Calculation of effective tax rates

	Individual Statements			**Group Statement**
	Parent	Subsidiary 1: DE	Subsidiary 2: ES	Parent
Pre-tax Profit	100	100	100	300
Payout to parent	100	-100	0	0
TAXBASE	200	0	100	300
Tax	-60		-20	-80
After-tax profit	140		80	220
Dividends	80		-80	0
Net income	220		0	220
ETR (Parent)	0.300 (60/200)			0.267 (80/300)

Individual statements: In this example, a German parent company wholly owns two subsidiaries. Subsidiary 1 is located in Germany and Subsidiary 2 is located in Spain. All three companies have a pre-tax profit of 100. The German subsidiary transfers its pre-tax profit to the parent company, and the respective profit is taxed at the level of the parent company. Thus, the tax base of the parent company is 200 and the parent company pays 60 to the tax authorities. The Spanish subsidiary pays the domestic tax and pays out dividends to the parent company. As Germany has a territorial tax system, no further taxes are due. The dividends are not included in the tax base of the parent company, and thus the effective tax rate of the parent remains unchanged. If the Spanish subsidiary does not pay out dividends, the effective tax rate would not change either. This is a simplified example (e.g. Germany taxes 5% of foreign dividends with the German statutory tax rate).

Group statement: From a group perspective, no transfer of profits or dividend payouts took place. Thus, the pre-tax profit is 300. Unless additional disclosure shows precisely where the profits are earned, it is not possible to observe tax aggressiveness, as the composition of statutory tax rates is not observable. Additionally, financial reporting incentives could affect the effective tax rate of the group, e.g. if earnings are overstated or understated (not in this example).

Table 1. Institutional Setting - German Sample

Panel A: Differences between individual and group statements in Germany

Account	Private Firms	Public Firms
Individual Statements	German GAAP - Starting point to calculate taxes	German GAAP - Starting point to calculate taxes
Group Statements	German GAAP or IFRS - Provide information	IFRS - Provide information

Panel B: What do effective tax rates of parent companies capture?

Account	Private Firms	Public Firms
Individual Statements	Domestic tax strategies (Parent + all domestic subsidiaries)	Domestic tax strategies (Parent + all domestic subsidiaries)
Group Statements	Worldwide tax strategies + Financial reporting incentives *No capital market incentives*	Worldwide tax strategies + Financial reporting incentives, *Capital market incentives*

This table describes the institutional setting in Germany.

Table 2. Descriptive statistics – German sample

Panel A: Private firms – Individual statements

Variable	N	Mean	Sd	Min	P25	P50	P75	Max
$ETR_{i,t}$	2,219	0.310	0.200	0.001	0.147	0.316	0.427	0.886
$ROA_{i,t}$	2,219	0.066	0.068	0.001	0.021	0.045	0.085	0.399
$DEBT_{i,t}$	2,219	0.566	0.211	0.035	0.428	0.585	0.720	0.940
$PPE_{i,t}$	2,219	0.273	0.271	0.000	0.048	0.174	0.443	0.925
$INTANG_{i,t}$	2,219	0.013	0.030	0.000	0.001	0.004	0.011	0.234
$SIZE_{i,t}$	2,219	18.651	1.345	15.393	17.708	18.512	19.438	23.704
FAMILY	2,219	0.160	0.366	0.000	0.000	0.000	0.000	1.000
STATE	2,219	0.182	0.386	0.000	0.000	0.000	0.000	1.000

Panel B: Public firms – Individual statements

Variable	N	Mean	Sd	Min	P25	P50	P75	Max
$ETR_{i,t}$	1,080	0.272	0.183	0.001	0.123	0.273	0.381	0.886
$ROA_{i,t}$	1,080	0.084	0.077	0.001	0.034	0.060	0.104	0.399
$DEBT_{i,t}$	1,080	0.418	0.216	0.035	0.245	0.428	0.590	0.925
$PPE_{i,t}$	1,080	0.129	0.179	0.000	0.009	0.052	0.184	0.925
$INTANG_{i,t}$	1,080	0.016	0.038	0.000	0.000	0.003	0.012	0.234
$SIZE_{i,t}$	1,080	18.828	1.792	15.393	17.529	18.569	19.842	23.704
FAMILY	1,080	0.164	0.370	0.000	0.000	0.000	0.000	1.000
STATE	1,080	0.017	0.128	0.000	0.000	0.000	0.000	1.000

Panel C: Private firms – Group statements

Variable	N	Mean	Sd	Min	P25	P50	P75	Max
$ETR_{g,t}$	2,219	0.326	0.177	0.004	0.214	0.330	0.423	0.842
$ROA_{g,t}$	2,219	0.053	0.051	0.001	0.019	0.038	0.069	0.305
$DEBT_{g,t}$	2,219	0.655	0.171	0.152	0.556	0.674	0.773	0.993
$PPE_{g,t}$	2,219	0.369	0.270	0.001	0.135	0.308	0.604	0.918
$INTANG_{g,t}$	2,219	0.040	0.075	0.000	0.003	0.011	0.039	0.542
$SIZE_{g,t}$	2,219	18.999	1.362	16.014	18.027	18.843	19.749	24.281
FAMILY	2,219	0.160	0.366	0.000	0.000	0.000	0.000	1.000
STATE	2,219	0.182	0.386	0.000	0.000	0.000	0.000	1.000
$\#SUBS_g$	2,219	93.034	204.995	1.000	8.000	19.000	67.000	1431.000
$\#COUNTR_g$	2,219	3.211	8.530	0.000	0.000	0.000	2.000	70.000
$IFRS_{g,t}$	2,219	0.104	0.305	0.000	0.000	0.000	0.000	1.000

Panel D: Public firms – Group statements

Variable	N	Mean	Sd	Min	P25	P50	P75	Max
$ETR_{g,t}$	1,080	0.294	0.153	0.004	0.184	0.300	0.385	0.842
$ROA_{g,t}$	1,080	0.074	0.064	0.001	0.031	0.056	0.093	0.305
$DEBT_{g,t}$	1,080	0.557	0.194	0.152	0.407	0.588	0.700	0.993
$PPE_{g,t}$	1,080	0.173	0.191	0.001	0.040	0.104	0.231	0.918
$INTANG_{g,t}$	1,080	0.113	0.140	0.000	0.011	0.053	0.166	0.542
$SIZE_{g,t}$	1,080	19.234	1.840	16.014	17.930	18.934	20.225	24.281
FAMILY	1,080	0.164	0.370	0.000	0.000	0.000	0.000	1.000
STATE	1,080	0.017	0.128	0.000	0.000	0.000	0.000	1.000
$\#SUBS_g$	1,080	159.242	308.891	1.000	15.000	39.000	131.000	1431.000
$\#COUNTR_g$	1,080	11.337	17.663	0.000	1.000	6.000	13.000	148.000
$IFRS_{g,t}$	1,080	0.764	0.425	0.000	1.000	1.000	1.000	1.000

This table provides summary statistics of the German sample. *ETR* is income tax divided by *PRETAX*. *PRETAX* is calculated as net income plus total tax minus 0.95*dividends plus depreciation of financial assets. *ROA* is return on assets. *DEBT* is debt deflated by total assets. *PPE* is property, plant and equipment divided by total assets. *INTANG* is intangible assets deflated by total assets. *SIZE* is the natural logarithm of total assets. *FAMILY* is coded one if the majority of the shares is owned by families. *STATE* is coded one if the majority of the shares is owned by either the federal republic, the 16 states or any municipality. *#SUBS* is the number of subsidiaries of the group. *#COUNTR* is the number of different countries where the subsidiaries are located. *IFRS* is coded one if the financial statement is prepared in accordance with International Financial Reporting Standards. All non-dichotomous data are winsorized at the 1% and 99% level.

Table 3. Pearson correlations

		Group Statements											
	Variable	$PUBLIC_t$	$ETR_{g,t}$	$ROA_{g,t}$	$DEBT_{g,t}$	$PPE_{g,t}$	$INTANG_{g,t}$	$SIZE_{g,t}$	$FAMILY$	$STATE$	$\#SUBS_g$	$\#COUNTR_g$	$IFRS_{g,t}$
Individual Statements	$PUBLIC_t$		-0.09***	0.18***	-0.25***	-0.35***	0.33***	0.07***	0.01	-0.23***	0.13***	0.30***	0.66***
	$ETR_{i,t}$	-0.09***		-0.20***	0.08***	-0.06***	0.01	0.01	0.04**	-0.05***	0.02	0.04**	-0.12***
	$ROA_{i,t}$	0.12***	-0.12***		-0.40***	-0.31***	0.04**	-0.15***	0.16***	-0.18***	0.03*	0.07***	0.18***
	$DEBT_{i,t}$	-0.31***	0.06***	-0.34***		0.20***	-0.09***	0.17***	-0.08***	0.14***	0.02	-0.02	-0.24***
	$PPE_{i,t}$	-0.27***	-0.06***	-0.21***	0.26***		-0.35***	0.07***	-0.13***	0.50***	-0.16***	-0.25***	-0.44***
	$INTANG_{i,t}$	0.04**	0.01	0.01	0.04**	-0.08***		0.11***	0.02	-0.17***	0.10***	0.25***	0.39***
	$SIZE_{i,t}$	0.06***	-0.05***	-0.12***	0.17***	0.06***	-0.11***		-0.14***	0.04**	0.37***	0.53***	0.17***
	$FAMILY$	0.01	0.04**	0.15***	-0.07***	-0.11***	0.06***	-0.15***		-0.17***	-0.12***	0.05***	-0.05***
	$STATE$	-0.23***	0.01	-0.11***	0.08***	0.30***	-0.08***	0.00	-0.17***		-0.11***	-0.13***	-0.23***
												0.38***	0.18***
													0.31***

The table provides Pearson correlations for individual statements below the diagonal and Pearson correlations for group statements above the diagonal. *ETR* is income tax divided by *PRETAX*. *PRETAX* is calculated as net income plus total tax minus 0.95*dividends plus depreciation of financial assets. *ROA* is return on assets. *DEBT* is debt deflated by total assets. *PPE* is property, plant and equipment divided by total assets. *INTANG* is intangible assets deflated by total assets. *SIZE* is the natural logarithm of total assets. *FAMILY* is coded one if the majority of the shares is owned by families. *STATE* is coded one if the majority of the shares is owned by either the federal republic, the 16 states or any municipality. *#SUBS* is the number of subsidiaries of the group. *#COUNTR* is the number of different countries where the subsidiaries are located. *IFRS* is coded one if the financial statement is prepared in accordance with International Financial Reporting Standards. All non-dichotomous data are winsorized at the 1% and 99% level. ***/**/* mark significance at the 1/5/10% level.

Table 4. Regressions – Effective tax rates

	Individual Statements				Group Statements				
$ETR_{i/g,t}$	(1)	(2)	(3)	(4) PSM	(5)	(6)	(7)	(8) PSM	(9) No IFRS
Constant	0.310***	0.423***	0.626***	0.429***	0.326***	0.385***	0.630***	0.525***	0.779***
	(0.006)	(0.023)	(0.063)	(0.097)	(0.005)	(0.021)	(0.077)	(0.182)	(0.100)
$PUBLIC_t$	**-0.038*** **	**-0.045*** **	**-0.044*** **	**-0.044*** **	**-0.032*** **	**-0.051*** **	**-0.046*** **	**-0.049***	**-0.094*** **
	(0.010)	**(0.013)**	**(0.014)**	**(0.016)**	**(0.009)**	**(0.012)**	**(0.015)**	**(0.026)**	**(0.022)**
FAMILY			0.023	0.070**			0.027**	0.032	0.031**
			(0.016)	(0.034)			(0.013)	(0.040)	(0.015)
$PUBLIC_t$*FAMILY			-0.002	-0.046			-0.032	-0.038	0.030
			(0.027)	(0.040)			(0.023)	(0.060)	(0.036)
$ROA_{i/g,t}$			-0.403***	-0.282***			-0.832***	-1.081***	-0.980***
			(0.063)	(0.095)			(0.075)	(0.151)	(0.096)
$DEBT_{i/g,t}$			0.020	-0.019			0.003	0.073	0.003
			(0.023)	(0.037)			(0.024)	(0.069)	(0.031)
$PPE_{i/g,t}$			-0.067***	0.050			-0.073***	-0.039	-0.078***
			(0.021)	(0.034)			(0.025)	(0.057)	(0.029)
$INTANG_{i/g,t}$			0.021	-0.078			0.057	0.008	0.208***
			(0.137)	(0.183)			(0.045)	(0.104)	(0.074)
$SIZE_{i/g,t}$			-0.010***	0.000			-0.011**	-0.011	-0.019***
			(0.003)	(0.005)			(0.004)	(0.011)	(0.006)
STATE			0.008	-0.044			-0.005	-0.004	0.001
			(0.017)	(0.034)			(0.018)	(0.044)	(0.018)
ln($\#SUBS_g$)							0.003	0.001	0.006
							(0.003)	(0.007)	(0.004)
$IFRS_{g,t}$							-0.017	-0.019	
							(0.012)	(0.026)	
Sub Country FE	No	No	No	No	No	Yes	Yes	Yes	Yes
Time, Ind., & LF FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
R-squared	0.008	0.079	0.109	0.113	0.008	0.166	0.233	0.382	0.254
N	3,299	3,299	3,299	1,082	3,299	3,299	3,299	704	2,244

The table provides OLS regression results using data from individual statements in Model 1 to Model 4 and data from group statements in Model 5 to Model 9. The dependent variable is *ETR*, which is income tax divided by *PRETAX*. *PUBLIC* is coded one if the respective firm is publicly listed. *ROA* is return on assets. *DEBT* is debt deflated by total assets. *PPE* is property, plant and equipment divided by total assets. *INTANG* is intangible assets deflated by total assets. *SIZE* is the natural logarithm of total assets. *FAMILY* is coded one if the majority of the shares is owned by families. *STATE* is coded one if the majority of the shares is owned by either the federal republic, the 16 states or any municipality. *#SUBS* is the number of subsidiaries of the group. *IFRS* is coded one if the financial statement is prepared in accordance with International Financial Reporting Standards. The models include fixed effects for time, industry (Ind.), legal form (LF) and countries of the subsidiaries (Sub Country) when indicated. Standard errors are clustered at firm level and are provided within the parentheses below the coefficients. All non-dichotomous data are winsorized at the 1% and 99% level. ***/**/* mark significance at the 1/5/10% level.

Table 5. Institutional Setting – European sample

Panel A: Taxation

Country	Tax Consolidation	Tax Base	Participation Exemption	Loss relief forward[1]	Loss relief backward[1]	Limited relief[2]
BE (Belgium)	No	Worldwide	Yes (max 95%)	∞	0	No
DE (Germany)	Yes	Worldwide	Yes (max 95%)	∞	1*	Yes
ES (Spain)	Yes	Worldwide	Yes (max 100%)	15	0	No
FI (Finland)	Limited	Worldwide	Yes (max 100%)	10	0	No
FR (France)	Yes	Territorial	Yes (max 95%)	∞	1*	Yes
IT (Italy)	Yes	Worldwide	Yes (max 95%)	∞	0	Yes
NO (Norway)	Limited	Worldwide	Yes (max 100%)	∞	0**	No
SE (Sweden)	Limited	Worldwide	Yes (max 100%)	∞	0	No

(1) in years (2) also known as minimum taxation * Maximum of 1 million. ** 2 years for liquidation losses. Data is based on the most recent Deloitte tax guides (https://dits.deloitte.com/#TaxGuides, last access: March 28, 2016).

Panel B: Financial Accounting

	Individual Statements		Group Statements	
Country	Unlisted	Listed[1]	Unlisted	Listed[1]
BE (Belgium)[2]	Local GAAP	Local GAAP	Local GAAP / IFRS	IFRS
DE (Germany)	Local GAAP	Local GAAP	Local GAAP / IFRS	IFRS
ES (Spain)	Local GAAP	Local GAAP	Local GAAP / IFRS	IFRS
FI (Finland)	Local GAAP / IFRS	Local GAAP / IFRS	Local GAAP / IFRS	IFRS
FR (France)	Local GAAP	Local GAAP	Local GAAP / IFRS	IFRS
IT (Italy)[3]	Local GAAP / IFRS	IFRS	Local GAAP / IFRS	IFRS
NO (Norway)	Local GAAP / IFRS	Local GAAP / IFRS	Local GAAP / IFRS	IFRS
SE (Sweden)[4]	Local GAAP	Local GAAP	Local GAAP / IFRS	IFRS

(1) Listed on a EU regulated market. (2) Individual Statements: IFRS required for investment firms as of 2007; Group statements: IFRS required for unlisted banks, insurance companies, and investment firms as of 2006 (3) Individual Statements: IFRS required for banks, IFRS not allowed for very small companies and insurance companies; Group statements: IFRS required for banks and insurance companies, not allowed for very small unlisted companies (4) Group statements: IFRS required for banks, insurance companies, and investment firms. Data is based on the most recent jurisdiction profile of the IFRS Foundation and the IASB (http://www.ifrs.org/use-around-the-world/pages/jurisdiction-profiles.aspx, last access: March 28, 2016).

Table 6. Descriptive statistics – European sample

Panel A: Private firms – Individual statements

Variable	N	Mean	Sd	Min	P25	P50	P75	Max
$ETR_{i,t}$	43,693	0.271	0.175	0.001	0.159	0.268	0.342	0.873
$ROA_{i,t}$	43,693	0.108	0.112	0.002	0.034	0.073	0.141	0.666
$DEBT_{i,t}$	43,693	0.652	0.227	0.053	0.493	0.680	0.836	1.000
$PPE_{i,t}$	43,693	0.529	0.264	-0.259	0.352	0.555	0.730	0.988
$INTANG_{i,t}$	43,693	0.022	0.059	0.000	0.000	0.003	0.015	0.400
$SIZE_{i,t}$	43,693	10.283	1.720	5.186	9.117	10.315	11.346	14.843
FAMILY	43,693	0.365	0.481	0.000	0.000	0.000	1.000	1.000
STATE	43,693	0.052	0.221	0.000	0.000	0.000	0.000	1.000
$IFRS_{i,t}$	43,693	0.011	0.104	0.000	0.000	0.000	0.000	1.000

Panel B: Public firms – Individual statements

Variable	N	Mean	Sd	Min	P25	P50	P75	Max
$ETR_{i,t}$	2,837	0.232	0.155	0.001	0.108	0.236	0.321	0.873
$ROA_{i,t}$	2,837	0.100	0.090	0.002	0.040	0.073	0.129	0.666
$DEBT_{i,t}$	2,837	0.740	0.179	0.093	0.635	0.769	0.876	1.000
$PPE_{i,t}$	2,837	0.516	0.255	-0.259	0.346	0.546	0.712	0.988
$INTANG_{i,t}$	2,837	0.034	0.071	0.000	0.001	0.007	0.025	0.400
$SIZE_{i,t}$	2,837	12.226	1.780	6.595	10.830	12.050	13.729	14.843
FAMILY	2,837	0.140	0.347	0.000	0.000	0.000	0.000	1.000
STATE	2,837	0.019	0.138	0.000	0.000	0.000	0.000	1.000
$IFRS_{i,t}$	2,837	0.132	0.338	0.000	0.000	0.000	0.000	1.000

Panel C: Private firms – Group statements

Variable	N	Mean	Sd	Min	P25	P50	P75	Max
$ETR_{g,t}$	43,693	0.329	0.157	0.002	0.252	0.297	0.383	0.879
$ROA_{g,t}$	43,693	0.095	0.085	0.003	0.037	0.071	0.126	0.607
$DEBT_{g,t}$	43,693	0.599	0.213	0.064	0.447	0.619	0.768	0.999
$PPE_{g,t}$	43,693	0.453	0.272	-0.319	0.278	0.489	0.656	0.974
$INTANG_{g,t}$	43,693	0.049	0.090	0.000	0.002	0.013	0.047	0.480
$SIZE_{g,t}$	43,693	10.691	1.666	5.220	9.612	10.664	11.676	15.133
FAMILY	43,693	0.365	0.481	0.000	0.000	0.000	1.000	1.000
STATE	43,693	0.052	0.221	0.000	0.000	0.000	0.000	1.000
$\#SUBS_g$	43,693	56.823	180.065	1.000	4.000	8.000	19.000	1285.000
$\#COUNTR_g$	43,693	2.382	4.512	0.000	1.000	1.000	2.000	87.000
$IFRS_{g,t}$	43,693	0.093	0.290	0.000	0.000	0.000	0.000	1.000

Panel D: Public firms – Group statements

Variable	N	Mean	Sd	Min	P25	P50	P75	Max
$ETR_{g,t}$	2,837	0.303	0.136	0.002	0.235	0.295	0.356	0.879
$ROA_{g,t}$	2,837	0.102	0.083	0.003	0.048	0.078	0.127	0.607
$DEBT_{g,t}$	2,837	0.688	0.166	0.064	0.594	0.720	0.810	0.999
$PPE_{g,t}$	2,837	0.278	0.329	-0.319	0.013	0.320	0.529	0.974
$INTANG_{g,t}$	2,837	0.144	0.145	0.000	0.023	0.089	0.232	0.480
$SIZE_{g,t}$	2,837	12.533	1.833	5.579	11.078	12.439	14.156	15.133
FAMILY	2,837	0.140	0.347	0.000	0.000	0.000	0.000	1.000
STATE	2,837	0.019	0.138	0.000	0.000	0.000	0.000	1.000
$\#SUBS_g$	2,837	129.671	255.269	1.000	11.000	32.000	93.000	1285.000
$\#COUNTR_g$	2,837	12.966	17.988	0.000	2.000	6.000	16.000	148.000
$IFRS_{g,t}$	2,837	0.640	0.480	0.000	0.000	1.000	1.000	1.000

Continued on next page

Table 6 continued

Panel E: Effective tax rates by country

	N		Individual			Consolidated		
Country	Private	Public	Private	Public	Delta	Private	Public	Delta
BE (Belgium)	989	84	0.220	0.182	-0.038*	0.333	0.295	-0.038**
DE (Germany)	6,895	1,408	0.265	0.216	-0.049***	0.316	0.299	-0.017***
ES (Spain)	4,967	110	0.246	0.200	-0.046***	0.291	0.247	-0.044***
FI (Finland)	5,098	276	0.236	0.210	-0.026***	0.262	0.245	-0.017***
FR (France)	2,786	184	0.217	0.223	0.006	0.315	0.304	-0.011
IT (Italy)	9,188	420	0.417	0.334	-0.083***	0.471	0.401	-0.070***
NO (Norway)	9,673	135	0.210	0.235	0.025**	0.287	0.300	0.013
SE (Sweden)	4,097	220	0.223	0.210	-0.013	0.273	0.244	-0.029***
Total / Average	43,693	2,837	0.271	0.232	-0.039***	0.329	0.303	-0.026***

This table provides summary statistics of the European sample. *ETR* is total tax expense divided by pre-tax income. *ROA* is return on assets. *DEBT* is debt deflated by total assets. *PPE* is property, plant and equipment divided by total assets. *INTANG* is intangible assets deflated by total assets. *SIZE* is the natural logarithm of thousand total assets. *FAMILY* is coded one if the majority of the shares is owned by families. *STATE* is coded one if the majority of the shares is owned by either the federal republic, the states or any municipality. *#SUBS* is the number of subsidiaries of the group. *#COUNTR* is the number of different countries where the subsidiaries are located. *IFRS* is coded one if the financial statement is prepared in accordance with International Financial Reporting Standards. All non-dichotomous data are winsorized at the 1% and 99% level. ***/**/* mark significance at the 1/5/10% level

Table 7. Regressions – Effective tax rates of individual statements

$ETR_{i,t}$	ALL	BE	DE	ES	FI	FR	IT	NO	SE
Constant	0.441***	0.369***	0.421***	0.383***	0.322***	0.426***	0.706***	0.420***	0.397***
	(0.048)	(0.071)	(0.026)	(0.024)	(0.038)	(0.115)	(0.036)	(0.016)	(0.021)
PUBLIC$_t$	**-0.024****	**-0.015**	**-0.033*****	**-0.023***	**-0.017**	**0.025****	**-0.041*****	**0.021**	**-0.007**
	(0.007)	**(0.019)**	**(0.005)**	**(0.013)**	**(0.012)**	**(0.011)**	**(0.008)**	**(0.014)**	**(0.010)**
FAMILY	0.003***	0.049**	0.008*	0.011***	0.003	0.052***	0.005	-0.024***	0.014
	(0.009)	(0.021)	(0.004)	(0.004)	(0.004)	(0.006)	(0.004)	(0.003)	(0.030)
$PUBLIC_t$*	-0.007***	-0.284***	-0.008		-0.058***	-0.045*	0.008		-0.017
FAMILY	(0.010)	(0.038)	(0.012)		(0.020)	(0.024)	(0.033)		(0.036)
$ROA_{i,t}$	-0.317**	-0.231***	-0.130***	-0.210***	-0.242***	-0.158***	-0.911***	-0.300***	-0.354***
	(0.078)	(0.052)	(0.027)	(0.021)	(0.017)	(0.038)	(0.034)	(0.010)	(0.019)
$DEBT_{i,t}$	-0.099	-0.122***	-0.026**	-0.030***	0.027**	-0.041***	-0.187***	-0.133***	0.026**
	(0.040)	(0.025)	(0.011)	(0.011)	(0.011)	(0.016)	(0.011)	(0.006)	(0.012)
$PPE_{i,t}$	-0.058***	-0.031	-0.059***	-0.054***	-0.060***	-0.066***	-0.099***	-0.015***	-0.082***
	(0.016)	(0.024)	(0.009)	(0.010)	(0.009)	(0.014)	(0.011)	(0.005)	(0.010)
$INTANG_{i,t}$	0.073	-0.044	0.117**	-0.048	0.069	0.034	0.111***	0.252***	-0.061
	(0.046)	(0.112)	(0.058)	(0.031)	(0.043)	(0.046)	(0.032)	(0.031)	(0.045)
$SIZE_{i,t}$	-0.006***	-0.014***	-0.002*	-0.003*	-0.005***	-0.001	-0.015***	-0.006***	-0.006***
	(0.002)	(0.004)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
STATE	0.043***	-0.084**	0.063***	-0.014	0.016	0.030*	0.039***	0.018*	-0.001
	(0.011)	(0.041)	(0.009)	(0.018)	(0.012)	(0.018)	(0.013)	(0.009)	(0.012)
Country FE	Yes	No	No	No	No	No	No	No	No
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.266	0.212	0.061	0.085	0.078	0.093	0.257	0.121	0.132
N	46,530	1,073	8,303	5,077	5,374	2,970	9,608	9,808	4,317

The table provides OLS regression results using European data from individual statements. *ETR* is total tax expense divided by pre-tax income. *PUBLIC* is coded one if the respective firm is publicly listed. *ROA* is return on assets. *DEBT* is debt deflated by total assets. *PPE* is property, plant and equipment divided by total assets. *INTANG* is intangible assets deflated by total assets. *SIZE* is the natural logarithm of thousand total assets. *FAMILY* is coded one if the majority of the shares is owned by families. *STATE* is coded one if the majority of the shares is owned by either the federal republic, the states or any municipality. Standard errors are clustered at country level in the Model "All". Otherwise the models use robust standard errors and are provided within the parentheses below the coefficients. All non-dichotomous data are winsorized at the 1% and 99% level. ***/**/* mark significance at the 1/5/10% level.

Table 8. Regressions – Effective tax rates of group statements

$ETR_{g,t}$	ALL	BE	DE	ES	FI	FR	IT	NO	SE
Constant	0.483***	0.519***	0.440***	0.377***	0.347***	0.424***	0.733***	0.417***	0.415***
	(0.045)	(0.100)	(0.028)	(0.029)	(0.029)	(0.052)	(0.042)	(0.015)	(0.018)
PUBLIC$_t$	**-0.020*** **	**-0.042**	**-0.031*** **	**-0.033** **	**-0.041*** **	**0.015**	**-0.024** **	**-0.004**	**-0.015**
	(0.005)	**(0.033)**	**(0.008)**	**(0.014)**	**(0.015)**	**(0.013)**	**(0.010)**	**(0.015)**	**(0.010)**
FAMILY	0.007**	0.054*	0.013***	0.012***	0.004	0.042***	-0.011***	0.003	0.032
	(0.004)	(0.031)	(0.004)	(0.004)	(0.003)	(0.006)	(0.004)	(0.003)	(0.028)
$PUBLIC_t$* *FAMILY*	-0.010	-0.039	0.008		-0.013	-0.070	0.009		-0.019
	(0.008)	(0.088)	(0.011)		(0.026)	(0.027)	(0.030)		(0.031)
$ROA_{g,t}$	-0.320**	-0.124*	-0.233***	-0.164***	-0.212***	-0.101**	-1.112***	-0.291***	-0.270***
	(0.097)	(0.068)	(0.037)	(0.024)	(0.017)	(0.049)	(0.040)	(0.014)	(0.020)
$DEBT_{g,t}$	-0.062***	-0.047	-0.032***	-0.039***	0.024**	-0.028*	-0.090***	-0.086***	0.014
	(0.023)	(0.037)	(0.011)	(0.012)	(0.010)	(0.016)	(0.010)	(0.007)	(0.011)
$PPE_{g,t}$	-0.015	0.047	-0.043***	-0.014	-0.025***	0.010	0.006	0.002	-0.046***
	(0.009)	(0.034)	(0.010)	(0.011)	(0.008)	(0.015)	(0.011)	(0.006)	(0.010)
$INTANG_{g,t}$	0.145***	0.562***	0.073**	0.003	0.239***	0.044	0.236***	0.245***	0.092***
	(0.039)	(0.093)	(0.032)	(0.028)	(0.031)	(0.031)	(0.027)	(0.020)	(0.027)
$SIZE_{g,t}$	-0.009***	-0.028***	-0.003*	-0.001	-0.008***	-0.008***	-0.025***	-0.009***	-0.009***
	(0.002)	(0.006)	(0.002)	(0.002)	(0.001)	(0.003)	(0.002)	(0.001)	(0.001)
STATE	0.034***	-0.044	0.046***	-0.032*	0.002	-0.021	0.034***	0.017	0.024***
	(0.009)	(0.076)	(0.008)	(0.017)	(0.010)	(0.020)	(0.011)	(0.011)	(0.008)
ln($\#SUBS_g$)	0.003**	0.014***	0.001	0.004***	0.003**	0.006***	0.003**	0.004***	-0.001
	(0.001)	(0.004)	(0.002)	(0.001)	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)
$IFRS_{g,t}$	-0.006	-0.002	-0.013*	-0.002		0.153***	-0.023***		
	(0.009)	(0.035)	(0.007)	(0.012)		(0.016)	(0.007)		
Sub C. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	No	No	No	No	No	No	No	No
Time/Ind. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.295	0.312	0.086	0.104	0.143	0.181	0.294	0.164	0.177
N	46,530	1,073	8,303	5,077	5,374	2,970	9,608	9,808	4,317

The table provides OLS regression results using European data from group statements. *ETR* is total tax expense divided by pre-tax income. *PUBLIC* is coded one if the respective firm is publicly listed. *ROA* is return on assets. *DEBT* is debt deflated by total assets. *PPE* is property, plant and equipment divided by total assets. *INTANG* is intangible assets deflated by total assets. *SIZE* is the natural logarithm of thousand total assets. *FAMILY* is coded one if the majority of the shares is owned by families. *STATE* is coded one if the majority of the shares is owned by either the federal republic, the states or any municipality. *#SUBS* is the number of subsidiaries of the group. *IFRS* is coded one if the financial statement is prepared in accordance with International Financial Reporting Standards. The models include fixed effects for country, time, industry (Ind.) and countries of the subsidiaries (Sub C.) when indicated. Standard errors are clustered at country level in the Model "All". Otherwise the models use robust standard errors and are provided within the parentheses below the coefficients. All non-dichotomous data are winsorized at the 1% and 99% level. ***/**/* mark significance at the 1/5/10% level.

Table 9. Regressions – Conforming and non-conforming tax avoidance

Panel A: Individual statements

$ETRTA_{i,t}$	ALL	BE	DE	ES	FI	FR	IT	NO	SE
Constant	0.019***	0.012*	0.009***	0.006*	0.023***	-0.006*	0.018***	0.030***	0.012***
	(0.003)	(0.007)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)
***PUBLIC*$_t$**	**-0.002****	**0.000**	**-0.002****	**-0.007*****	**-0.003***	**0.003***	**-0.001**	**-0.002**	**0.001**
	(0.001)	**(0.002)**	**(0.001)**	**(0.002)**	**(0.001)**	**(0.002)**	**(0.001)**	**(0.003)**	**(0.002)**
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	No	No	No	No	No	No	No	No
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.477	0.513	0.516	0.529	0.622	0.462	0.587	0.411	0.507
N	42,971	977	7,611	4,641	4,934	2,719	8,840	9,329	3,920

Panel B: Group statements

$ETRTA_{g,t}$	ALL	BE	DE	ES	FI	FR	IT	NO	SE
Constant	0.016***	0.038	0.004	-0.001	0.016***	-0.011***	0.019***	0.028***	0.022***
	(0.003)	(0.012)	(0.003)	(0.003)	(0.004)	(0.003)	(0.002)	(0.004)	(0.004)
***PUBLIC*$_t$**	**-0.002****	**-0.002**	**-0.002***	**-0.004***	**-0.006*****	**-0.002**	**-0.002***	**-0.004***	**0.001**
	(0.001)	**(0.002)**	**(0.001)**	**(0.002)**	**(0.001)**	**(0.002)**	**(0.001)**	**(0.002)**	**(0.002)**
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sub Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	No	No	No	No	No	No	No	No
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.702	0.799	0.685	0.801	0.772	0.742	0.801	0.656	0.691
N	39,301	904	7,079	4,221	4,497	2,406	8,110	8,365	3,719

The table provides OLS regression results using European data from individual statements in Panel *A* and from group statements in Panel *B*. *ETRTA* is total tax expense divided by total assets. *PUBLIC* is coded one if the respective firm is publicly listed. Control variables and fixed effects are included in line with Table 7 and Table 8. The models include fixed effects for time, industry, country, and countries of the subsidiaries (Sub Country) when indicated. Standard errors are clustered at country level in the Model "All". Otherwise the models use robust standard errors and are provided within the parentheses below the coefficients. All non-dichotomous data are winsorized at the 1% and 99% level. ***/**/* mark significance at the 1/5/10% level.

Table 10. Regressions – IPOs

	Individual		Group	
$ETR_{i/g,t}$	(1)	(2)	(3)	(4)
Constant	0.272***	0.074	0.358***	0.182
	(0.021)	(0.224)	(0.016)	(0.193)
PUBLIC$_t$	**-0.033***	**-0.026**	**-0.048*****	**-0.044****
	(0.019)	**(0.021)**	**(0.016)**	**(0.019)**
$ROA_{i/g,t}$		-0.288*		-0.294**
		(0.153)		(0.117)
$DEBT_{i/g,t}$		-0.141**		-0.058
		(0.062)		(0.079)
$PPE_{i/g,t}$		0.047		-0.007
		(0.069)		(0.098)
$INTANG_{i/g,t}$		0.187		-0.072
		(0.167)		(0.235)
$SIZE_{i/g,t}$		0.024		0.020
		(0.021)		(0.017)
$IFRS_{g,t}$				-0.010
				(0.034)
Firm FE	No	Yes	No	Yes
Time FE	No	Yes	No	Yes
R-squared	0.009	0.628	0.027	0.576
N	520	520	520	520

The table provides OLS regression results using European data from individual and group statements. The sample is limited to firms that carried out an IPO within the observation period. *ETR* is total tax expense divided by pre-tax income. *PUBLIC* is coded one if the respective firm is publicly listed. *ROA* is return on assets. *DEBT* is debt deflated by total assets. *PPE* is property, plant and equipment divided by total assets. *INTANG* is intangible assets deflated by total assets. *SIZE* is the natural logarithm of thousand total assets. *FAMILY* is coded one if the majority of the shares is owned by families. Standard errors are clustered at firm level and are provided within the parentheses below the coefficients. All non-dichotomous data are winsorized at the 1% and 99% level. ***/**/* mark significance at the 1/5/10% level.

Table 11. Regressions – Long-run effective tax rates

	Individual Statements			Group Statements		
Long-run ETR$_{i,g}$	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.267***	0.185***	0.465***	0.337***	0.279***	0.501***
	(0.049)	(0.004)	(0.049)	(0.050)	(0.015)	(0.039)
PUBLIC	**-0.038**	**-0.041*** **	**-0.022** **	**-0.044**	**-0.036*** **	**-0.031** **
	(0.036)	**(0.010)**	**(0.007)**	**(0.036)**	**(0.007)**	**(0.012)**
FAMILY			0.013			0.007
			(0.008)			(0.015)
PUBLIC$_t$			-0.017			0.017
**FAMILY*			(0.029)			(0.029)
mean*(ROA$_{i/g,t}$)*			-0.412**			-0.457**
			(0.123)			(0.175)
mean*(DEBT$_{i/g,t}$)*			-0.147*			-0.137**
			(0.073)			(0.040)
mean*(PPE$_{i/g,t}$)*			-0.076***			0.036
			(0.017)			(0.033)
mean*(INTANG$_{i/g,t}$)*			0.180*			0.236
			(0.092)			(0.133)
mean*(SIZE$_{i/g,t}$)*			-0.010***			-0.013**
			(0.002)			(0.004)
STATE			0.058			0.029
			(0.021)			(0.025)
#SUBS						0.004
						(0.003)
IFRS$_{g,t}$						-0.019
						(0.022)
Sub Country FE	No	No	No	No	Yes	Yes
Country / Ind. FE	No	Yes	Yes	No	Yes	Yes
R-squared	0.005	0.277	0.360	0.009	0.423	0.489
N	1,764	1,764	1,764	1,764	1,764	1,764

The table provides OLS regression results using data from individual statements in Model 1 to Model 3, and data from group statements in Model 4 to Model 6. In contrast to all other tables, firm-years with negative pre-tax income are not deleted. All variables are calculated as the mean of all observations per firm over the sample period. Firms with a negative *average* pre-tax income are deleted from the sample. The independent variable is the long-run *ETR*, which is the average of effective tax rates. *ETR* is total tax expense divided by pre-tax income. *ROA* is return on assets. *DEBT* is debt deflated by total assets. *PPE* is property, plant and equipment divided by total assets. *INTANG* is intangible assets deflated by total assets. *SIZE* is the natural logarithm of total assets. *FAMILY* is coded one if the majority of the shares is owned by families. *STATE* is coded one if the majority of the shares is owned by either the federal republic, the 16 states or any municipality. *#SUBS* is the number of subsidiaries of the group. *IFRS* is coded one if the financial statement is prepared in accordance with International Financial Reporting Standards. The models include fixed effects for industry (Ind.), country and countries of the subsidiaries (Sub Country) when indicated. All non-dichotomous data are winsorized at the 1% and 99% level. ***/**/* mark significance at the 1/5/10% level.