How Does Earnings Management Differ Across European Countries? Evidence from Deferred Tax Accounting

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1. Introduction

Recent literature documented the particular relevance of deferred tax asset valuation allowances for the size of the effective tax rate. Drake et al. (2020) show that the downward trend in effective tax rates of US firms over the past twenty years can be largely explained by the valuation allowance related to prior year losses. Similarly, Schwab et al. (2022) point to the particular relevance of deferred tax assets and other items unrelated to tax avoidance for explaining very low or very high values of GAAP effective tax rates. Koch/Scheider (2023) show, for a sample of European listed firms, that the relationship between GAAP ETR and firm value relates largely to the accounting treatment of tax losses.

At the same time, prior literature has also revealed that accounting for deferred tax assets involves a considerable level of discretion. According to IAS 12, firms can capitalize deferred tax assets only if they can expect sufficient profits in the near future to offset underlying tax losses or utilize temporary differences. This discretion can be used for earnings management purposes, as prior literature suggests (see section 2 for details). Observed patterns include adjustments to meet analyst's forecasts or income smoothing. The majority of these existing studies, however, is restricted to single countries or specific industries.

We use a cross-country sample of European listed firms to evaluate to what extent firms use deferred tax accounting in order to manage their GAAP earnings. Using a cross-country setting allows us, in particular, to compare the use of earnings management patterns across countries and relate these differences to certain firm- and country characteristics. We employ to different research designs for our analysis. First, we use a fixed effects OLS model to identify the general use of earnings management patterns in our sample. Second, we use a prediction regression model to identify firms that use tax-related earnings management. Using a logistic regression model, we then identify the firm- and country characteristics that determine the use of tax-related earnings management. This allows us, amongst others, to analyze to what extent specific features of the tax system (e.g., tax rate or loss-offset regulations) alleviate earnings management.

Our findings for the first model indicate that firms in our sample strategically decide on the capitalization of deferred tax assets in order to manage earnings in accordance with analyst's forecasts or to reach prior year profits. We also find that firms use deferred taxes in order to extend big bath accounting. However, our results provide only limited evidence that firms also use deferred tax assets in order to manage their GAAP effective tax rate itself.

The use of the second research design mainly confirms these findings, particularly with regard to the income smoothing and analyst forecast incentive. Using logistic regressions, we also document that firms in countries with high corporate tax rates and time restrictions in loss carryforward use these earnings management strategies. These findings thus seem to indicate that countries can alleviate earnings management with specific features of their local tax systems. We observe a more intense use of tax-related earnings management also in countries with a higher tax morale score.

The remainder of this paper proceeds as follows. In section 2, we review related literature. We present our research design and describe our data in section 3, while empirical results are presented in section 4. Section 5 concludes our paper.

2. Related literature and contribution

The primary goal of our study is to shed light on the extent to which European listed firms strategically use existing scrutiny with regard to the accounting treatment of tax loss carryforwards and other deferred tax assets.

IAS 12 provides the legal framework for the capitalization of deferred tax assets on the balance sheet of our sample firms. In principle, capitalization of deferred tax assets requires that a firm expects sufficient profits in the near future that allow for an offset of tax losses or a utilization of temporary differences (IAS 12.34). The forecast of future profits, however, involves a considerable level of subjectivity. In a public statement, the European Securities and Markets Authority (2019) states that all positive and negative available sources of evidence have to be included in this judgement. The institution is guided by the "more likely than not" threshold, which sets the cutoff at a 50% probable usage. Müller et al. (2014) therefore conclude that a hidden balance sheet option exists in practice for the recognition of deferred tax assets.

Various studies have investigated the use of deferred tax positions for earnings management purposes in single country settings, mainly based on US data. Miller & Skinner (1998) identify no use of valuation allowances for earnings adjustments in their study. Phillips et al. (2003) analyze the usefulness of deferred tax information for the detection of earnings management for a US firm sample. Their findings indicate that firms use deferred tax accounting in order to avoid GAAP losses as well as for a smoothing of profits over time. Deferred tax accounting may also follow other motives. Frank & Rego (2006) identify that firms use valuation

allowance accounts to align earnings with analyst forecasts. Christensen et al. (2008) consider deferred tax valuation allowances to maximize one-year losses for generating earnings-maximizing potential for subsequent years. Ettredge et al. (2008) examine tax-related earnings managements in fraud cases using a time series analysis. According to their findings, the deferred tax expense increases before the fraud year and reverses afterwards.

Further analyses reveal heterogeneity in these effects across countries, industries and firm-size classes. Herbohn et al. (2010) document that Australian firms use unrecognized deferred taxes on tax loss carryforwards to meet profit forecasts by financial market analysts. Dreher (2019) finds that German firms use available discretion in the accounting for tax losses to reach financial analysts' forecasts and to smooth earnings movements. Gordon & Joos (2004) examine the predictive power of unrecognized deferred taxes in the United Kingdom. Their results confirm the assumption that currently unrecognized deferred taxes influence profitability in subsequent years. They also indicate a correlation with future reversals of deferred taxes, which can be interpreted as an indicator of earnings management.

Schrand & Wong (2003) consider valuation allowances in the financial sector and examine possible evidence of accounting policies. The sample initially complies with SFAS No. 109[1], which allows an unlimited valuation allowance on deferred tax assets. However, banks with high equity levels report relatively higher valuation allowances, enabling firms to write-up them and thus increase earnings in subsequent years. Using these earnings, banks can adjust their current profits upward and smooth them with previous years. The authors use these results to identify indications of profit smoothing and, in addition, indications of approximation of profit forecasts by financial market analysts. Bauman et al. (2000) consider possible accounting policies in the U.S. market of the largest companies by revenue as reported by the Fortune 500. They identify that financial statement disclosures are often insufficient to detect valuation allowances having an impact on earnings. Specifically, their example of US Airways refutes the imperative connection between reconciliations and real earnings effects. Burgstahler et al. (2002) research the incentive for accounting policy by deferred tax assets for firms with small profits and small losses. Their results suggest intentional manipulation to increase profits or

[1] SFAS No. 109 is a U.S. standard for accounting of income taxes issued by the U.S. FASB. It uses the asset and liability approach to recognize deferred taxes for subsequent fiscal years.

avoid losses totally. Firms with small profits reduce their deferred tax assets by using the valuation allowance account more than those with small losses. In their sample, a larger reduction in the valuation allowance occurs for firms that reverse a loss to a profit.

Our paper contributes to this literature and extends it. Using a European firm sample allows us to compare tax-related earnings management across countries. This allows us to generalize prior findings, which mainly relate to single countries and by majority the US. Having an international data set also enables us to evaluate to what extent countries can alleviate GAAP earnings management through a specific design of their local tax system and, thus, provide their domestic firms with a competitive advantage.

3. Research Design and Data

3.1. Research Design

We base our analysis on two different research designs. First, we use a fixed effects OLS regression model to observe the general existence of tax-related earnings manipulation patterns in our cross-country firm sample (see Equation (1)).

$$\Delta \text{ UDTA } \%_{it} \text{ or } \Delta \text{ UDTA TLCF}\%_{it} = \beta_1 \text{INCENTIVE}_{it} + \beta_2 \Delta \text{ FUTURE}_{it} + \beta_3 \text{EARN}_{it} + \beta_4 \Delta \text{ MTB}_{it} + \beta_5 \text{DISTRESS}_{it} + \beta_6 \text{STRATEGY}_{it} + \beta_7 \text{PASTROA}_{it} + \beta_8 \text{ZSCORE}_{it} + \beta_9 \Delta \text{ TAX RATE}_{it} + \gamma_i + \delta_t + \varepsilon_{it} \quad (1)$$

The earnings management literature primarily uses end-of-period valuation allowances or the change in valuation allowances as the dependent variable (Miller & Skinner, 1998; Burgstahler et al., 2002; Schrand & Wong, 2003; Frank & Rego, 2006; Christensen et al., 2008). We follow the latter approach and consider the change in unrecognized deferred tax assets from year t_{-1} to t_0 and scale the delta by the total of deferred tax assets in determining the dependent variable $\Delta\text{UDTA } \%_{it}$. We compare the use of overall deferred tax assets and deferred tax assets related to tax losses by accordingly determining a second dependent variable $\Delta \text{ UDTA TLCF}\%_{it}$, which reflects only the use of deferred tax assets related to tax losses.

The explanatory variable of main interest captures the firm-level incentive to manipulate earnings. In line with prior literature we focus on three different motives to manipulate GAAP earnings, namely (1) management of profits to financial analysts' profit forecasts, (2) smoothing

of profits to the previous year's profit[2] and (3) loss maximization in order to improve earnings potential in subsequent years (big-bath accounting).

We use the dummy variable $BelowIBES_{it}$ to capture the incentive to adjust accounting earnings upwards in order to meet financial analysts' profit forecasts. $BelowIBES_{it}$, thus, takes the value one if the pre-managed profit ranges lower than the forecasts. We exclude the changes in unrecognized deferred tax assets (or deferred tax assets from loss carryforwards) from the reported profit in order to determine pre-managed profits. As we assume that firms manipulate earnings upwards if $BelowIBES_{it}$ is one, we expect a negative effect on the level of unrecognized deferred tax assets, as captured by our dependent variables $\Delta\,\mathrm{UDTA}\,\%_{\mathrm{it}}$ and $\Delta\,\mathrm{UDTA\ TLCF}\%_{\mathrm{it}}$.

The variable $Smoothing_{it}$ captures the second earnings manipulation incentive. This dummy variable equals one if a firm's pre-managed profit is below the profit of the previous fiscal year. We also analyze whether firms use deferred tax accounting in order to adjust GAAP earnings in line with a big-bath accounting incentive. The respective dummy variable $BigBath_{it}$ takes the value one if the firm reports a high loss prior to any adjustment. A high loss is assumed if the pre-managed loss exceeds the median of all negative firm-year observations. We expect a positive coefficient for $BigBath_{it}$, indicating a downward manipulation of profits.

The selection of control variables is based on the existing literature (e.g. Christensen et al., 2008; Dreher, 2019). We provide detailed definitions of all variables in Appendix 1. $\Delta FUTURE_{it}$ controls for a change in the firm's expectation of future taxable income from deferred tax liabilities, which can lead to an increase in recognized deferred tax assets (or deferred tax assets on TLCF) (e.g. Behn et al., 1998; Christensen et al., 2008; Dreher, 2019). $EARN_{it}$ controls for manager's expectations about the firm's future taxable income that may result from its recent earnings history (e.g. Behn et al., 1998; Christensen et al., 2008). ΔMTB_{it} controls for changed company profitability that modify DTA in accordance with IAS 12.34 (e.g. Miller & Skinner, 1998; Burgstahler et al., 2002; Frank & Rego, 2006; Christensen et al., 2008). The dummy variable $DISTRESS_{it}$ is assigned the value one if the operating cash flow, operating income or after-tax profit is negative in the current year (e.g. Behn et al., 1998; Christensen et al., 2008). $STRATEGY_{it}$ – that is, the firm's ETR in the relevant year – is a proxy for its ability and ambition to realize potential tax savings (e.g. Behn et al., 1998; Christensen et al., 2008).

[2] We consider both profit approximation (1) and profit smoothing (2) upwards. This implies earnings management by boosting the pre-managed income.

With *PASTROA*$_{it}$, we control for a manager's expectations of future taxable income derived from the firm's financial performance and productivity (e.g. Miller & Skinner, 1998; Christensen et al., 2008). *ZSCORE* is intended to capture the firm's chance of survival respectively its financial strength and their effects on expected future taxable income (e.g. Miller & Skinner, 1998; Christensen et al., 2008). Lastly, we filter out effects due resulting from statutory modifications in corporate tax rates[3] of the parent company by *Δ TAX RATE* (e.g. Silva et al., 2021).

We use a second research design, based on Christensen et al. (2008), in order to more directly identify firms that use tax-related earnings manipulation, which allows us to then analyze relevant firm- and country characteristics that determine the use of this type of earnings management strategy. This research design follows a two-step approach. In a first step, we identify firm-year observations that show a pattern of tax-related earnings manipulation. To this end, we use regressions for a control group to predict year-end values of *UDTA%* and *UDTA TLCF%* for each firm-year. We then explore whether the firm-year-level prediction error, i.e. the deviation between the actual value and the predicted value of the dependent variable, can be related to earnings management incentives. Control groups are defined separately for each earnings management incentive and capture all firm-year observations for which the respective earnings management incentive was not present in the current year as well as the two preceding years.

The prediction regression is described by equation (2), which is similar to equation (1). However, as we aim to predict end-of-period unrecognized DTA (DTA TLCF), we replace the dependent variables as well as *Δ FUTURE*$_{it}$ and *Δ MTB*$_{it}$ by their respective end-of-period equivalents. Additionally, we omit the incentive variables.

$$\begin{aligned}\text{UDTA \%}_{it} \text{ or UDTA TLCF\%}_{it} \;=\; & \beta_1 \text{FUTURE}_{it} + \beta_2 \text{EARN}_{it} + \beta_3 \text{MTB}_{it} + \\ & \beta_4 \text{DISTRESS}_{it} + \beta_5 \text{STRATEGY}_{it} + \beta_6 \text{PASTROA}_{it} + \beta_7 \text{ZSCORE}_{it} + \\ & \beta_8 \Delta \text{ TAX RATE}_{it} + \gamma_i + \delta_t + \varepsilon_{it} \end{aligned} \quad (2)$$

Based on the resulting regression coefficients as well as estimated values for industry and year fixed effects, we predict expected outcomes for *UDTA%*$_{it}$ and *UDTATLCF%*$_{it}$ for firm-year observations that hold an earnings management incentive. By subtracting the estimated values from the actual values reported, we determine the prediction errors. Firm-years with positive prediction errors are classified as "HigherUDTA(TLCF)", whereas firm-years with negative prediction errors are classified as "LowerUDTA(TLCF)". Following Christensen et

[3] We collect the required country-specific corporate tax rates provided by OECD (2022).

al. (2008), we exclude firm-years from this classification for which no unrecognized DTA (DTA TLCF) have been reported or none of the potential deferred tax assets (TLCF) have been recognized, as it seems unlikely that these firms have exercised any discretion in determining the recoverability of deferred tax assets (on TLCF).

We assume in accordance with Christensen et al. (2008) that the identification of tax-related earnings management can be improved if also the future development of prediction errors is considered. Any intentional deviation from the true value of *UDTA%* or *UDTA TLCF%* that follows short-term earnings management incentives will likely reverse in the future. We use two different reversal categories in order to capture this effect: End-of-period unrecognized DTA (DTA TLCF) in t_{+1} or in t_{+2} that are lower than in t_0 indicate a reversal; no reversal is assumed in all other cases.

In a third step, we aim to determine which firm- and country-related factors promote earnings management (Equation (3)). To this end, we utilize a logistic regression model. As to the dependent variables, we consider two patterns of earnings management: The first pattern relates to the expression of the prediction error in the current year given the presence of an earnings management incentive. Thus, the dependent dummy variable *EM PATTERN A* takes the value 1 if an earnings management incentive is present in the given firm-year and the sign of the prediction error from estimating equation (2) points in the expected direction. The second pattern *EM PATTERN AB* requires also the presence of a reversal in the expected direction.

$$\begin{aligned}\text{EM PATTERN A}_{it} \text{ or EM PATTERN AB}_{it} = {} & \beta_1 \text{SIZE}_{it} + \beta_2 \text{GROWTH}_{it} + \\ & \beta_3 \text{ROA}_{it} + \beta_4 \text{LEVERAGE}_{it} + \beta_5 \text{DEBTMATURITY}_{it} + \beta_6 \text{BOARDSIZE}_{it} + \\ & \beta_7 \text{BOARD\_IND}_{it} + \beta_8 \text{MANAGEMENT\_SC}_{it} + \beta_9 \text{STRATEGIC\_INV}_{it} + \\ & \beta_{10} \text{WWGI}_{it} + \beta_{11} \text{DISCLOSURE}_{it} + \beta_{12} \text{LGDP}_{it} + \beta_{13} \text{GDPGROWTH}_{it} + \\ & \beta_{14} \text{TTR}_{it} + \beta_{15} \text{LCF\_TIMELIMIT}_{it} + \beta_{16} \text{LCF\_MINTAX}_{it} + \\ & \beta_{17} \text{LOSSCARRYBACK}_{it} + \beta_{18} \text{TAXMORALE}_{it} + \gamma_i + \delta_t + \varepsilon_{it} \end{aligned} \quad (3)$$

We include firm-level and country-level variables as independent variables, that have been identified as relevant determinants of earnings management by prior research. We provide detailed definitions of all variables in Appendix 1. With *SIZE*, *GROWTH*, *ROA*, *LEVERAGE* and *DEBTMATURITY*, we include a standard set of firm-level control variables capturing size and financial characteristics that may predict earnings management (e.g. Burgstahler et al.,

2006; Gaio, 2010; Lemma et al., 2013). Further, we include *BOARDSIZE*, *BOARD_IND*, *MANAGEMENT_SC* and *STRATEGIC_INV* to filter for firm-related agency effects (e.g. Beatty & Harris, 1998; Jiraporn et al., 2008; Lemma et al., 2013). With *WWGI*, *DISCLOSURE*, *LGDP* and *GDPGROWTH* we control for cross-country differences in the institutional and (socio-) economic environments (e.g. Burgstahler et al., 2006; Gaio, 2010; Lemma et al., 2013). We also include year and industry fixed effects.

We further assume that tax-related variables tax-related predict earnings management. Therefore, we extend equation (3) by introducing variables relating to tax rate, loss offset regulations and tax morale. With regard to the statutory corporate tax rate of the group parent (*TTR*), we expect a positive sign, as a higher tax rate implies a larger benefit of earnings management. With regard to loss offsetting regulations, we adopt the definitions of Dressler & Overesch (2013) who classify dummy variables respectively indicating the country-specific existence of a time limit for loss carryforwards (*LCF_TIMELIMIT*), a minimum taxation regime (*LCF_MINTAX*) and a carryback option of losses (*LOSSCARRYBACK*). With regard to *LCF_TIMELIMIT* and *LOSSCARRYBACK*, we expect negative signs, as both a time limit for loss carryforwards and a carryback option of losses tend to reduce the stock of loss carryforwards, which in turn decreases a firm's ability to exercise discretion in determining the recoverability of corresponding deferred tax assets. In contrast, we expect positive signs for *LCF_MINTAX*, as a minimum taxation regime generally leads to a higher stock of loss carryforwards and thus more discretion. In respect of tax morale, we include country-related marginal effects measures reported by Alm & Torgler (2006) (*TAXMORALE*) and suspect that a higher tax morale is negatively associated with the extent of earnings management in a given country.

3.2. Data and Descriptive Statistics

The aim of our study is to break down the accounting policy findings into country-specific differences in dealing with earnings management, so that unified accounting regulations maximize comparability and substantially strengthen the informative power. We select the Stoxx Europe 600, which includes the largest 600 European listed companies (including Switzerland and the UK) based on free float market capitalization (STOXX, 2017). Our heterogeneous sample is guided by Regulation (EC) No. 1606/2002, which governs IFRS reporting for all EU-listed firms. Swiss companies have an accounting option to use IFRS, US GAAP, or Swiss GAAP with the majority of Swiss firms using IFRS. UK has even implemented IFRS directly.

The index is subject to rolling adjustments, so we include such firms indexed in November 2021 and collect data for the ten-year period from 2011 to 2020.

< Insert table 1 about here >

In table 1, we illustrate our sample selection starting with 6,000 observations referring to 600 firms over the time period from 2011 to 2020. Special accounting rules are applied to the banking and finance sector (710 observations) and the insurance branch (290 observations), which are therefore removed in line with existing literature (e.g. Burgstahler et al., 2002; Gordon & Joos, 2004; Chludek, 2011). For the remaining 5,000 observations, we hand collected all necessary data for DTA (DTA on TLCF) reported from published annual reports. Certain items that are relevant to our investigation are not fully disclosed in the consolidated financial statements. This may be either because the item is not required to be disclosed under IFRS, or the entity concerned is not complying with an existing disclosure requirement. Where possible, we inferred missing items based on the information disclosed. Of central importance for our examination is, for example, the (theoretical) amount of unrecognized DTA on TLCF. According to IAS 12.81 (e), loss carryforwards for which no deferred taxes have been capitalized are subject to disclosure requirements. While many companies have reported the corresponding tax value, we have calculated missing items in a simplified manner by multiplying the theoretical tax rate of the parent company by the value of the unrecognized loss carryforwards where necessary. Our sample is reduced further reduced due to incomplete information by 1,466 (unrecognized DTA TLCF) and 1,116 (unrecognized DTA) observations, respectively. We collected the remaining variables from ThomsonReuters. The computation of our three independent variables (*BelowIBES*, *Smoothing*, *BigBath*) leads to a selection decrease of 534 respectively 884 observations. The implementation of delta variables with t_{-1} reduces by 280 respectively 250 observations due to missing data from 2010. The availability and calculation of other variables lowers the sample by 855 respectively 638 observations, so that finally 1,865 firm years for unrecognized DTA TLCF and 2,112 firm years for unrecognized DTA are included in our initial analyses.

< Insert table 2 about here >

Table 2 reports summary statistiscs for all observations and variables entering Equation (1). We distinguish between the sample used for explaining *UDTA%* and *UDTA TLCF%,* respectively.

4. Empirical results

4.1. General existence of tax-related earnings management patterns

Initially, we use an OLS fixed effects regression to analyze in general whether capitalization of deferred tax assets can be aligned with earnings management incentives in our sample. To this end, we estimate Equation (1) and consider three different earnings management patterns for our main explanatory variable $INCENTIVE_{it}$, i.e., (1) adjusting profits to financial analyst forecasts, (2) smoothing profits with previous year's profits, and (3) big-bath accounting. We report the respective regression results in separate columns.

Regression results in table 3 refer to deferred tax assets related to tax loss carryforwards. The dependent variable *Δ UDTA TLCF%* captures the level unrecognized tax assets on loss carryforwards scaled by the overall level of deferred tax assets on loss carryforwards. Any positive coefficient for $INCENTIVE_{it}$ thus represents a downward adjustment of earnings. In line with prior literature, we expect negative coefficients in columns (1) and (2) and a positive coefficient for our main variable in column (3).

< Insert table 3 about here >

Our regression results confirm these theoretical predictions and thus indicate that firms in our sample use deferred tax assets on loss carryforwards to manage their earnings in the expected direction. In column (1), $INCENTIVE_{it}$ captures the incentive to adjust profits upwards to meet analyst's forecasts. We estimate a coefficient of -0.09, which is statistically significant at the 1% confidence interval. For firms with a pre-managed profit below the profit forecasts (1,231 observations, 66.0%[4]), the proportion of unrecognized DTA TLCF to the total amount of DTA TLCF is, on average, by 9 percentage points smaller With a total DTA TLCF average of 875 million euros, this effect is equivalent to a reduction by 79 million euros.

In column (2) of table 3, we provide evidence that firms also use deferred tax assets on loss carryforwards to adjust their profits to reach prior year profits ($Smoothing_{it}$=1). The coefficient of -0.04 is statistically significant at the 1% confidence interval, but somewhat smaller than the coefficient estimated in column (1). If pre-managed profit in t_0 is smaller than the profit in t_{-1} (773 observations, 41.4%), the proportion of unrecognized DTA TLCF decreases by 4%

[4] The relatively high level of shortfalls in profit forecasts is not an exclusive phenomenon in our sample. McKinsey & Company (2013) indicates an earnings per share shortfall of more than 40% compared to consensus estimates. The time period between forecast and profit publication remains irrelevant. As we use pre-managed profits including earnings management by deferred tax assets, higher values seem plausible in our study.

on average. Based to the total DTA TLCF amount, 4% represents an absolute reduction of 35 million euros.

Column (3) of table 3 presents our results of equation (1) with $BigBath_{it}$ as incentive. We examine whether our sample firms use big-bath accounting to manage earnings. In theory, big-bath accounting means that firms apply accounting policy to generate an extreme loss year in order to create income potential in subsequent financial years. Accordingly, firms with extremely high loss years would have to reduce recognized DTA TLCF and report noticeably high reversals of unrecognized DTA TLCF, so we expect a positive sign. Within our sample, we estimate for *BigBath* a coefficient of 0.16 on a statistically significant 1% confidence interval. If the firm reports a very high loss in t_0 (188 observations, 6.3%), the proportion of unrecognized DTA TLCF to the total amount of DTA TLCF increases by an average of 16%.

Columns (1) to (3) show results using winsorized variables at 1% and 99% levels to eliminate undesired bias due to outliers. Winsorizing affects *Δ UDTA TLCF%* and the control variables *Δ FUTURE*, *EARN*, *Δ MTB*, *STRATEGY*, *PASTROA* and *ZSCORE*. In columns (4) to (6), we show regression results without winsorizing as a robustness test. Coefficients for $INCENTIVE_{it}$ point in the same direction and are, again, statistically significant for all three earnings management incentives. The effect size is even stronger.

< Insert table 4 about here >

In table 4, we extend our analysis to the overall level of deferred tax assets. The dependent variable $UDTA\%_{it}$ now reflects the unrecognized share of all deferred tax assets, not only those related to tax losses. Again, columns (1) to (3) uses winsorizing for key variables, whereas columns (4) to (6) report regression results for the non-winsorized variables. Altogether, regression results in columns (1) to (3) are comparable to those reported in the previous table. However, we find no significant results for our main explanatory variable without winsorizing (columns (4) to (6)), which may indicate a possible distortion through influential outliers.

Our findings so far thus conclusively indicate that firms in our sample use deferred tax accounting to manage earnings in accordance with three different earnings management incentive patterns. In tables 5 and 6, we investigate whether firms also use deferred tax accounting in order to manage the GAAP effective tax rate in a desired direction (see also Cook et al., 2008 in this respect). We expect firms to adjust GAAP effective tax rates downwards if the pre-managed GAAP ETR exceeds analysts forecasts (columns (1) and (4)) or the prior-year GAAP

ETR (columns (2) and (5)). The opposite effect is expected if firms report very high values for the pre-managed effective tax rate (columns (3) and (6)).

< Insert tables 5 and 6 about here >

Again, regression results in table 5 relate to deferred tax assets on tax losses, whereas table 6 considers all types of deferred tax assets. We find no significant effects for our main variable of interest in table 5. Coefficients for $INCENTIVE_{it}$ are statistically insignificant in all six specifications. Also in table 6, our results provide only weak evidence for intentional ETR management. We find statistically significant coefficients for $INCENTIVE_{it}$ in columns (2), (4) and (5), indicating that ETR management can be observed, in particular, in order to not exceed prior year GAAP ETRs.

4.2. Cross-country differences in tax-related earnings management patterns

In this section, we investigate whether our initial results can be confirmed by means of a more thorough investigation, including a multiple period view and a firm-level analysis of earnings management. A strong indication of earnings management would be given if – in the case of *BelowIBES* or *Smoothing* (*BigBath*) – a firm reported lower-than-necessary unrecognized (higher-than-necessary) DTA (DTA TLCF) in t_0 and subsequently, in t_{+1} or t_{+2}, increased (decreased) unrecognized DTA (DTA TLCF). As described in section 3.1, we estimate prediction regressions over control groups of firm-years that should not be affected by the earnings management incentives of our interest (see equation (2)).

< Insert table 7 about here >

Columns (1) to (3) of table 8 show the prediction regressions of *UDTA TLCF%* for the respective control groups relating to the incentives *BelowIBES*, *Smoothing*, and *BigBath*. Similar to our initial regression models from the previous section, we have winsorized *UDTA TLCF%* and the control variables *FUTURE*, *EARN*, *MTB*, *STRATEGY*, *PASTROA* and *ZSCORE* at the 1st and 99th percentile. The adjusted R^2 amounts to 20.2%, 7.1% and 6.6% for the control groups of *BelowIBES*, *Smoothing*, and *BigBath*, respectively. Discrepancies compared to the results reported in tables 4 and 5 arise due to the different sample composition (control groups), the replacement of the independent variable, the variables *Δ FUTURE* and *Δ MTB* by their year-end equivalents as well as the omission of the incentive variables. Columns (4) to (6) show the corresponding results without winsorizing. By integrated outliers, the adjusted R^2 decreases,

while significance levels and signs of the coefficients remain largely unchanged. Consistent with our initial analysis, we conclude that winsorizing is appropriate in this context.

< Insert table 8 about here >

In columns (1) to (3) of table 9, we report the prediction regressions for *UDTA%*. Winsorizing at the 1st and 99th percentile improves the adjusted R^2, amounting to 39.1%, 31.2% and 25.5% for the control groups of *BelowIBES*, *Smoothing*, and *BigBath*, respectively.

We use the coefficients reported in tables 7 and 8 as well as industry and year fixed effects to calculate estimates of *UDTA%* and *UDTA TLCF%*. By subtracting the estimated values from the actual values reported, we determine the prediction errors and classify them as HigherUDTA(TLCF) or LowerUDTA(TLCF) (see section 3.1).

< Insert table 9 about here >

In table 9, we report an overview of the prediction error classification counts per country in t_0, based on our estimates of *UDTA TLCF%*. In the absence of earnings management, we would expect a symmetric distribution of negative and positive prediction error counts, i.e. equal observed probability of LowerUDTATLCF and HigherUDTATLCF, regardless of any earnings management incentive. Of the total 1,103 firm-years holding the *BelowIBES* incentive, 55% of prediction errors are classified – in line with our expectation – as LowerUDTATLCF. The true prevalence of lower-than-necessary *UDTA TLCF%* is statistically significantly higher than 50% on a 1% confidence interval. At a country level, a corresponding statistical significance can be found with regard to firms from Denmark, Luxembourg, Netherlands, Sweden, Switzerland and the United Kingdom, suggesting that especially in these countries, firms tend to report lower-than-necessary *UDTA TLCF%* in t_0 if their pre-managed income is below analyst forecasts. With regard to all sample firm-years, the *UDTA TLCF%* decrease by 0.56% on average, which corresponds to 5 million euros (0.76% of the average after-tax profit). In contrast, when considering firm-years classified as LowerUDTATLCF only, the *UDTA TLCF%* decrease by an average 3.23%, corresponding to 34 million euros (5.13% of the average after-tax profit). Overall, the sample contains 71 firm-years with a pre-managed income below but an actual profit above analyst forecasts (6% of incentivized firm-years).

With regard to the *Smoothing* incentive, our sample includes 711 firm-years. 58% of the corresponding prediction errors are classified as LowerUDTATLCF, which is also in line with our expectation. Again, the true probability is statistically significantly higher than 50% on a 1%

confidence interval. The results suggest that especially firms from Austria, Netherlands, Norway, Poland, Spain and Sweden tend to report lower-than-necessary unrecognized DTA TLCF in t_0 if their pre-managed income is below the previous year's profit. Considering all sample firm-years, the *UDTA TLCF%* decrease by 1.25% on average, which corresponds to 13 million euros (2.47% of the average after-tax profit). However, when considering firm-years classified as LowerUDTATLCF only, the UDTA TLCF% decrease by an average 4.35%, corresponding to 52 million euros (9.08% of the average after-tax profit). Altogether, the sample contains 52 firm-years with a pre-managed income below but an actual profit above the previous year's profit (7% of incentivized firm-years).

Of 101 firm-years holding the *BigBath* incentive, 47% of prediction errors lead to the expected HigherUDTATLCF classification. We find no indication that the true prevalence of higher-than-necessary unrecognized DTA TLCF is more than 50% and therefore, no indication of income-decreasing earnings management if a firm reports a high loss in t_0.

< Insert table 10 about here >

In table 10, we present an overview similar to table 9, but based on our estimates of *UDTA%*. Of 1,287 firm-years in which the pre-managed income is below analyst forecasts (*BelowIBES*), 52% are classified as LowerUDTA. Although only a small deviation from the assumed probability of 50%, it is statistically significant on a 10% confidence interval. The result is mainly driven by firms from Luxembourg, Netherlands, Spain, and Sweden, indicating that especially in these countries, firms tend to report lower-than-necessary unrecognized DTA in t_0 if their pre-managed income is below analyst forecasts. With regard to all sample firm-years, *UDTA%* decrease by 1.22% on average, which corresponds to 18 million euros (2.58% of the average after-tax profit). In contrast, when considering firm-years classified as LowerUDTA only, the *UDTA%* decrease by 3.11% on average, corresponding to 43 million euros (5.74% of the average after-tax profit). Overall, the sample contains 95 firm-years with a pre-managed income below but an actual profit above analyst forecasts (7% of incentivized firm-years).

Concerning firms facing the *Smoothing* incentive (825 observations), we also observe a similar LowerUDTA prevalence of 52%. The deviation is, however, not statistically significant. When considering individual countries, however, we find that firms from Germany, Netherlands, Spain, Sweden and Switzerland statistically significantly tend to report lower-than-necessary unrecognized DTA if facing a pre-managed income in t_0 that is below the previous year's profit.

Of 111 firm-years holding the *BigBath* incentive, 46% of prediction errors are classified as HigherUDTA. Similar to our analysis of *UDTA TLCF%*, there is no indication of income-decreasing earnings management if a firm reports a high loss in t_0.

< Insert table 11 about here >

In table 11, we present an overview of reversal incidence depending on prediction error classifications per country (both defined in section 3.1), based on our estimates of *UDTA TLCF%.* In the absence of earnings management, we would expect statistical independence of prediction error classification and reversal incidence. In the event of upwards earnings management, induced by the incentive *BelowIBES* or *Smoothing*, we would expect that significantly more firm-years classified as LowerUDTA(TLCF) are followed by reversals than firm-years classified as HigherUDTA(TLCF), and vice versa in the case of downwards earnings management (*BigBath*).

Of 462 LowerUDTATLCF firm-years holding the *BelowIBES* incentive, 71% are followed by a reversal in subsequent years, whereas of 314 HigherUDTATLCF observations, the same applies in only 56% of cases.[5] The difference is in line with our expectation and statistically significant on the 1% confidence interval. At country level, the result is driven by firms based in France, Luxembourg, Norway and the United Kingdom, suggesting that especially in these countries, firms that faced a pre-managed income below analyst forecasts and reported lower-than-necessary unrecognized DTA TLCF in t_0 tend to increase unrecognized DTA TLCF in t_{+1} or t_{+2}, which is a strong indication of upwards earnings management. When considering LowerUDTATLCF firm-years that are followed by a reversal, the *UDTA TLCF%* decrease by 3.35% on average, corresponding to 37 million euros (5.26% of the average after-tax profit). In the same context, we observe 17 firm-years with a pre-managed income below but an actual profit above the analyst forecasts (5%).

With regard to firms facing the *Smoothing* incentive, a similar pattern emerges: A reversal can be observed after 70% of the 280 LowerUDTATLCF firm-years, whereas the same applies for only 62% of the 173 HigherUDTATLCF firm-years. Again, the difference is in line with our expectation and statistically significant on a 10% confidence interval. At country level, a statistically significant difference can only be found for firms from the United Kingdom. Overall, and similar to *BelowIBES*, the results indicate that firms with a pre-managed profits below

[5] Note that the observation counts differ from their equivalents in table 10, as, due to the reversal definition, only observations up to and including 2018 are taken into account.

the previous years' profit that reported lower-than-necessary unrecognized DTA TLCF in t_0 tend to increase unrecognized DTA TLCF in subsequent periods, strongly suggesting upwards earnings management. With regard to LowerUDTATLCF firm-years that are followed by a reversal, the *UDTA TLCF%* decrease by 4.97% on average, corresponding to 64 million euros (10.55% of the average after-tax profit). In the same context, we find 17 firm-years with a pre-managed income below but an actual profit above the previous year's profit (9%).

In line with the results of our prediction error analysis above, we find no indication of downwards earnings management: Although slightly more HigherUDTATLCF firm-years holding the *BigBath* incentive are followed by a reversal (61%) than LowerUDTATLCF observations (57%), the difference is not statistically significant. When considering countries, a statistically significant difference in line with predicted earnings management can only be found for French firms. Since the *BigBath* sample generally is quite small (23 HigherUDTATLCF observations and 37 LowerUDTATLCF observations), we refrain from drawing any conclusions.

< Insert table 12 about here >

In table 12, we present an overview similar to table 11, but based on our estimates of *UDTA%*. Similar to our results relating to *UDTA TLCF%*, we find that of firms facing the *BelowIBES* incentive, statistically significantly more firms exhibit a reversal in t_{+1} or t_{+2} if classified as LowerUDTA (70% of 463 observations) than if classified as HigherUDTA (61% of 441 observations) in t_0 (1% significance level). [6] At country level, a statistically significant difference can be found for firms from Finland, Ireland, Netherlands and the United Kingdom, indicating that especially in these countries, firms that faced a pre-managed income below analyst forecasts and reported lower-than-necessary unrecognized DTA TLCF in t_0 tend to increase unrecognized DTA TLCF in t_{+1} or t_{+2}, which is a strong indication of upwards earnings management. When considering LowerUDTA firm-years that are followed by a reversal, the *UDTA%* decrease by 2.99% on average, corresponding to 24 million euros (2.81% of the average after-tax profit). In the same context, we observe 16 firm-years with a pre-managed income below but an actual profit above the analyst forecasts (5%).

Concerning firms facing the *Smoothing* incentive, we find that a reversal can be observed after 70% of the 265 LowerUDTA firm-years, whereas the same applies for 66% of the 264

[6] Note that the observation counts differ from their equivalents in table 11, as, due to the reversal definition, only observations up to and including 2018 are taken into account.

HigherUDTA firm-years. The difference is principally in line with our expectation, but not statistically significant. At country level, we cannot find any statistically significant differences, either.

Of 30 HigherUDTA firm-years holding the *BigBath* incentive, 60% are followed by a reversal in subsequent years, whereas of 36 LowerUDTA observations, the same applies in only 61% of cases. Both in the aggregate and at country level we find no statistical significances. Similar to our *UDTA TLCF%* analysis, the small sample size may not be sufficient to draw any conclusion.

As a summary, our initial results from section 4.1 have been partially confirmed in this more thorough investigation. In firm-years holding the *BelowIBES* and *Smoothing* incentives, we find strong indications that firms tend to engage in upwards earnings management by decreasing their *UDTA TLCF%* in t_0, followed by increasing unrecognized DTA TLCF in t_{+1} or t_{+2}. With regard to overall *UDTA%*, we find such strong indications only with respect to the *BelowIBES* incentive. In case of *Smoothing*, we find evidence that in certain countries, firms facing a pre-managed income below the previous year's profit tend to report lower-than-necessary unrecognized DTA in t_0. However, we do not find evidence that such firm-years are more often followed by reversals in this context. Concerning firms facing a high loss (*BigBath*), we find no evidence of downwards earnings management, which is in line with Christensen et al. (2008), who use a similar approach. We note, however, that a relatively small sample size may restrict the reliability of our results.

Overall, the indications of earnings management are stronger when considering unrecognized DTA on loss carryforwards only, instead of total unrecognized DTA. This implies that a significant degree of earnings management observed in this investigation originates from tax loss carryforwards. When considering prediction error classifications in t_0 only, we find a larger incidence of LowerUDTATLCF classifications for *Smoothing* (58%) than for *BelowIBES* (55%). With regard to subsequent reversals, however, we observe a larger difference between LowerUDTATLCF and HigherUDTATLCF firm-years in case of *BelowIBES* (71% vs. 56%) than in case of *Smoothing* (70% vs. 62%). The average decrease of *UDTA TLCF%* is distinctly larger for *Smoothing* both when considering all LowerUDTATLCF classifications in t_0 (52 million euros) and when considering reversal observations only (64 million euros) than for *BelowIBES* (34 and 37 million euros, respectively).

As a robustness test, we have changed the scaling of the independent variables as well as *FUTURE* from total DTA (on TLCF) to total assets (e.g. Dreher, 2019). In another variation, we have considered two instead of three periods when assigning firm-years to the control groups and defining reversals. In neither of the variations, material differences to the above results arise.

4.3. Firm- and country-related determinants of earnings management

In this section, we use the patterns observed in chapter 4.2 in order to analyze which firm- and country-specific characteristics promote earnings management. To this end, we use logistic regression models to predict the dependent dummy variables *EM PATTERN A* and *EM PATTERN AB* (as introduced in section 3.1) in the context of *BelowIBES* (relating to *UDTA TLCF%* or *UDTA%* estimates) and *Smoothing* (relating to *UDTA TLCF%* estimates).[7]

< Insert table 13 about here >

In table 13, we report fixed effects logistic regressions of *EM PATTERN A*, which considers only earnings management patterns in t_0 (irrespective from any subsequent reversal). Columns (1) to (3) show logistic regressions with respect to *BelowIBES* and *Smoothing*. Columns (4) to (6) show the corresponding regressions after introducing tax-related variables. In the context of *UDTA TLCF%* and *BelowIBES* (column (1)), we observe a highly significant positive association between *SIZE* and *EM PATTERN A* (1% significance level). This finding supports the arguments that larger firms have inherently more earnings management opportunities with their accounting (e.g. Lemma et al., 2013), face greater capital market pressures (e.g. Richardson et al., 2002) and have more bargaining power with auditors (e.g. Nelson et al., 2002).

The coefficient of *ROA* is also positive and significant on the 5% level, implying that firms that engage in earnings management tend to be more profitable. Our results suggest that with every one percentage point increase of return on assets, it becomes 3.1% more likely that *EM PATTERN A* takes the value 1, compared to its likelihood of taking the value 0.

[7] In other circumstances discussed above, we have not found statistically significant indications of earnings management. As a consequence, we omit them in this investigation.

A statistically highly significant and positive association is found in case of *LEVERAGE*, indicating that firms that engage in earnings management tend to be higher leveraged. The corresponding odds-ratio suggests that for every percentage point increase of *LEVERAGE*, it becomes 1.6% more likely that *EM PATTERN A* takes the value 1, compared to its likelihood of taking the value 0. This result lends weight to the theory that firms with higher leverage tend to engage in earnings management to avoid debt contracting violations (e.g. Sweeney, 1994; Richardson et al., 2002).

In case of *DEBTMATURITY*, we find a negative coefficient (5% confidence level). This finding indicates that firms engaging in earnings management tend to have less current liabilities, and thus, longer debt maturity. It is suggested that with every percentage point increase of *DEBTMATURITY*, it becomes 1.0% less likely that *EM PATTERN A* takes the value 1, compared to its likelihood of taking the value 0. This finding contradicts the argument of Diamond (2004) that firms with more short-term debt have an incentive to avoid bad news and to engage in earnings management.

The coefficient of *STRATEGIC_INV* is negative and significant on the 10% level. This implies that firms engaging in earnings management tend to have less strategic investors. The odds-ratio suggests that with every percentage point increase of strategic investors in a firm, it becomes 0.7% less likely that *EM PATTERN A* takes the value 1, compared to its likelihood of taking the value 0. This finding supports the theory that, as strategic investors focus on long-term shareholder value instead of current earnings, managers' short-term earnings management incentives are reduced with strategic ownership (e.g. Lemma et al., 2013).

Further, we observe a highly significant positive relationship between the country-specific variable *WWGI* and *EM PATTERN A*. The corresponding odds-ratio implies that an increase of the average percentile rank relating to the world bank's "Worldwide Governance Indicators" by 1 increases the likelihood that *EM PATTERN A* takes the value 1, compared to its likelihood of taking the value 0, by 6.7%. This finding suggests that earnings management is more prevalent in institutionally and socio-economically higher developed countries.

Further, we find a negative relationship between *GDPGrowth* and *EM PATTERN A* (5% significance level), suggesting that firms engaging in earnings management are based in countries with less economic growth. Based on the resulting odds-ratio, with every percentage point increase of *GDPGrowth* it becomes 9.3% less likely that likely that *EM PATTERN A* takes the value 1, compared to its likelihood of taking the value 0.

After introducing tax-related variables (column (4)), no material differences arise to the results described above. With regard to the statutory tax rate (*TTR*), we find a statistically significant positive association (5% confidence interval). This is in line with our prediction, as a higher tax rate means a larger benefit of earnings management. The odds-ratio indicates that a percentage point increase of the statutory tax rate leads to a 5.30% higher likelihood that EM Pattern A takes the value 1, compared to its likelihood of taking the value 0.

Further, the results suggest a positive relationship between time limits of loss carryforwards and earnings management (5% significance level). The existence of a corresponding time limit makes it 2.83 times more likely that *EM PATTERN A* takes the value 1, compared to its likelihood of taking the value 0. This result is not in line with our expectation, as a time limit for the use of loss carryforwards should generally reduce the stock of loss carryforwards, and in turn decrease a firm's ability to exercise discretion in determining the recoverability of corresponding deferred tax assets.

Lastly, we observe a positive coefficient of *TAXMORALE* (5% significance level), which is also not in line with our prediction. The result suggests that firms engaging in earnings management tend to be based in countries with higher tax morale. With regard to a minimum taxation regime in the context of loss carryforwards (*LCF_MINTAX*) and a loss carryback option (*LOSSCARRYBACK*), we find no significant associations.

Columns (2) and (5) show regressions also in the context of firm-years holding the *BelowIBES* incentive, but with regard to *UDTA%* estimates. Unlike the results relating to *UDTA TLCF%*, no significant effect of *SIZE*, *ROA* and *LEVERAGE* on the dependent variable can be found. For *DEBTMATURITY*, we again observe a negative association that is weaker but highly significant (1% confidence interval). The coefficient of *STRATEGIC_INV* is positive (5% significance level), implying that in the context of total unrecognized DTA, a percentage point increase of strategic investors in a firm means a 0.8% increase of the likelihood that *EM PATTERN A* takes the value 1, compared to its likelihood of taking the value 0. This result contradicts our finding in the *UDTA TLCF%* specification. For *WWGI*, we again find a highly significant and positive association that is comparable to the *UDTA TLCF%* specification. When we introduce tax-related variables (column (5)), we observe similar tendencies compared to the results in the context of *UDTA TLCF%,* as *TTR*, *LCF_TIMELIMIT* and *TAXMORALE* are statistically significant and have positive signs. However, lower odds-ratios and larger confidence intervals imply a diluted effect compared to the consideration of *UDTA TLCF%*. This again

suggests that a significant degree of the earnings management indicated in this investigation originates from tax loss carryforwards.

In columns (3) and (6), we report regressions in the context of *UDTA TLCF%* and the *Smoothing* incentive. Similar to column (1), *SIZE* and *LEVERAGE* show positive coefficients that are statistically significant (5% confidence interval). Also, we observe a negative coefficient of *BOARDSIZE* (5% confidence level). The corresponding odds-ratio suggests that per additional board member, the likelihood of *EM PATTERN A* taking the value 1 decreases by 7.5%, as opposed to its likelihood of taking the value 0. This result is in line with the theory that larger boards have greater monitoring capacity and increasingly multifaceted expertise (e.g. Dalton et al., 1998; John & Senbet, 1998). Interestingly, the tax-related variables (introduced in column (6)) show no statistically significant effects in the context of *Smoothing*.

< Insert table 14 about here >

In table 14, we present an overview similar to table 13, but relating to the dependent variable *EM PATTERN AB*, which takes the value of 1 for firm-years holding the respective earnings management incentive that are classified as LowerUDTA(TLCF) and show a reversal in t_{+1} or t_{+2}.[8] With exception of *SIZE* (in case of *BelowIBES*) and *BOARDSIZE* (in case of *Smoothing*), for which we find similar but slightly stronger tendencies compared to regressions of *EM PATTERN A*, the control variables relating to firm-characteristics seem to explain the dependent variable less well. For *WWGI*, we observe similar effects compared to regressions of *EM PATTERN A*.

TTR is significant on the 10% level in the *UDTA TLCF% BelowIBES* specification only, but showing a slightly higher odds ratio in this context. The odds-ratios and t-values of *LCF_TIMELIMIT* in both *BelowIBES* specifications increase compared to regressions of *EM PATTERN A*. In the *UDTA TLCF% BelowIBES* specification, the coefficient of *LCF_MINTAX* is positive and significant on the 5% level. This result implies that the existence of a minimum taxation regime in a country makes it 2.02 times more likely that *EM PATTERN AB* takes the value 1, compared to its likelihood of taking the value 0. This in in line with our expectation, as a minimum taxation regime generally leads to a higher stock of loss carryforwards and thus more discretion in determining the recoverability of corresponding deferred tax assets. With

[8] As a robustness test, we have omitted observations from the regressions that are classified as LowerUDTA(TLCF) but show no reversal in subsequent years. The corresponding results corroborate our findings described in this section and are partially stronger.

regard to *TAXMORALE*, we find a statistically significant positive relationship only for the *UDTA TLCF% BelowIBES* specification.

As a summary, the logistic regression model utilized to predict earnings management works significantly better in the *BelowIBES* specifications. In this context, robust predictors of both dependent variables *EM PATTERN A* and *EM PATTERN AB* are *SIZE*, *WWGI*, *TTR*, *LCF_TIMELIMIT* and *TAXMORALE*. The results indicate that firms that engage in upwards earnings management after facing a pre-managed income below analyst forecasts feature higher total assets and tend to be based in higher-developed countries with higher statutory tax rates, a time limit for the use of tax loss carryforwards and higher tax morale. Weaker effects of the tax-related variables in the *UDTA%* model than in the *UDTA TLCF%* model as well as the results in section 4.2 imply that a significant degree of earnings management in this context originates from tax loss carryforwards. Slightly stronger effects of the tax-related variables in the models including a reversal incidence as well es the results in section 4.2 indicate that a multi-period view is practical in identifying earnings management with tax loss carryforwards. With the *Smoothing* models, we find no significant predictors except for *BOARDSIZE*.

5. Conclusion

We employ a cross-country sample of European listed firms to evaluate to what extent firms use deferred tax accounting in order to manage their GAAP earnings. Using a cross-country setting allows us, in particular, to compare the use of earnings management patterns across countries and relate these differences to certain firm- and country characteristics. We employ to different research designs for our analysis. First, we use a fixed effects OLS model to identify the general use of earnings management patterns in our sample. Second, we use a prediction regression model to identify firms that use tax-related earnings management. Using a logistic regression model, we then identify the firm- and country characteristics that determine the use of tax-related earnings management. This allows us, amongst others, to analyze to what extent specific features of the tax system (e.g., tax rate or loss-offset regulations) alleviate earnings management.

Our findings for the first model indicate that firms in our sample strategically decide on the capitalization of deferred tax assets in order to manage earnings in accordance with analyst's forecasts or to reach prior year profits. We also find that firms use deferred taxes in order to

extend big bath accounting. However, our results provide only limited evidence that firms also use deferred tax assets in order to manage their GAAP effective tax rate itself.

The use of the second research design mainly confirms these findings, particularly with regard to the income smoothing and analyst forecast incentive. Using logistic regressions, we also document that firms in countries with high corporate tax rates and time restrictions in loss carryforward use these earnings management strategies. These findings thus seem to indicate that countries can alleviate earnings management with specific features of their local tax systems. We observe a more intense use of tax-related earnings management also in countries with a higher tax morale score.

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Tables

TABLE 1
Sample Selection

	UDTA TLCF%		*UDTA%*	
600 Firms over 10 Years		6,000		6,000
Excluding Banks & Financial Services	./.	710	./.	710
Excluding Insurances	./.	290	./.	290
Excluding Non-Available UDTA (TLCF) Data	./.	1,466	./.	1,116
Excluding Incomplete Data for Independent V.	./.	534	./.	884
Excluding Incomplete Delta Variables	./.	280	./.	250
Excluding Incomplete Data for Other Variables	./.	855	./.	638
Final Sample		**1,865**		**2,112**

TABLE 2
Descriptives Statistics for Equation (1)

Variable	(1) Obs	(2) Mean	(3) Std. Dev.	(4) Min	(5) Max
Panel A: Equation (1) using *Δ UDTA TLCF%*					
Δ UDTA TLCF%	1,865	-0.0102	0.2975	-1.9728	0.7816
BelowIBES	1,865	0.6601	0.4738	0.0000	1.0000
Smoothing	1,865	0.4145	0.4928	0.0000	1.0000
BigBath	1,865	0.0633	0.2435	0.0000	1.0000
Δ FUTURE	1,865	0.4771	4.4208	-7.1890	47.1664
EARN	1,865	0.1482	0.4081	-0.0815	5.5490
Δ MTB	1,865	0.1403	1.4482	-7.4062	6.8805
DISTRESS	1,865	0.1228	0.3283	0.0000	1.0000
STRATEGY	1,865	0.2200	0.2453	-0.9057	1.2667
PASTROA	1,865	0.0705	0.0465	-0.0048	0.3111
ZSCORE	1,865	2.6272	1.4603	-0.2839	7.9676
Δ TAX RATE	1,865	-0.0043	0.0204	-0.1000	0.1000
Panel B: Equation (1) using *Δ UDTA%*					
Δ UDTA%	2,112	-0.0052	0.2332	-1.4326	0.6289
BelowIBES	2,112	0.6487	0.4775	0.0000	1.0000
Smoothing	2,112	0.4143	0.4927	0.0000	1.0000
BigBath	2,112	0.0611	0.2395	0.0000	1.0000
Δ FUTURE	2,112	0.4619	4.3004	-7.1890	47.1664
EARN	2,112	0.1575	0.4731	-0.0815	5.5490
Δ MTB	2,112	0.1441	1.3885	-7.4062	6.8805
DISTRESS	2,112	0.1231	0.3286	0.0000	1.0000
STRATEGY	2,112	0.2216	0.2464	-0.9057	1.2667
PASTROA	2,112	0.0707	0.0461	-0.0048	0.3111
ZSCORE	2,112	2.6521	1.4612	-0.2839	7.9676
Δ TAX RATE	2,112	-0.0044	0.0209	-0.1000	0.1000

This table presents summary statistics for all components in our starting sample for equation (2).

TABLE 3
Unrecognized DTA TLCF: Incentives for Earnings Management in t_0

Dependent var.:		(1)	(2)	(3)	(4)	(5)	(6)
Δ UDTA TLCF%	*predicted:*	BelowIBES	Smoothing	BigBath	BelowIBES	Smoothing	BigBath
INCENTIVE	*(-), (-), (+)*	-0.0903***	-0.0439***	0.1614***	-0.1465***	-0.1346***	0.3206**
		(-5.98)	(-3.00)	(4.00)	(-2.84)	(-2.71)	(2.35)
Δ FUTURE	*(-)*	0.0013	0.0012	0.0016	0.0000	-0.0000	0.0000
		(0.81)	(0.78)	(1.03)	(0.03)	(-0.05)	(0.05)
EARN	*(-)*	-0.0101	-0.0071	-0.0086	-0.0165	-0.0116	-0.0163
		(-0.57)	(-0.40)	(-0.48)	(-0.29)	(-0.21)	(-0.29)
Δ MTB	*(-)*	-0.0127***	-0.0135***	-0.0135***	-0.0001	-0.0001	-0.0001
		(-2.63)	(-2.76)	(-2.77)	(-0.15)	(-0.15)	(-0.13)
DISTRESS	*(+)*	0.0493**	0.0410*	-0.0483*	0.0499	0.0571	-0.1381
		(2.23)	(1.83)	(-1.66)	(0.67)	(0.76)	(-1.39)
STRATEGY	*(-)*	0.0193	0.0102	0.0270	0.0086	0.0094	0.0123
		(0.67)	(0.35)	(0.92)	(0.43)	(0.47)	(0.61)
PASTROA	*(-)*	0.3203	0.2747	0.2699	0.3959	0.3539	0.3334
		(1.63)	(1.39)	(1.37)	(0.64)	(0.58)	(0.54)
ZSCORE	*(-)*	-0.0211***	-0.0214***	-0.0179***	-0.0043	-0.0068	0.0015
		(-3.08)	(-3.10)	(-2.59)	(-0.19)	(-0.30)	(0.06)
Δ TAX RATE	*(-)*	0.0294	-0.0483	-0.0067	-0.9349	-1.1241	-0.9938
		(0.08)	(-0.14)	(-0.02)	(-0.78)	(-0.94)	(-0.83)
Observations		1,865	1,865	1,865	1,865	1,865	1,865
Adj. R-sq		0.0381	0.0241	0.0278	0.0014	0.0010	0.0000
Industry Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes

This table presents results from fixed effects OLS regressions estimating equation (1). Columns (1) to (3) include winsorized data, columns (4) to (6) do not. The dependent variable is *Δ UDTA TLCF%*, the changing unrecognized DTA TLCF from t_{-1} to t_0, scaled by total DTA TLCF. Detailed definitions on the dependent and all independent variables is presented in Appendix 1. Standard errors are robust to heteroscedasticity. T statistics are given in parentheses. ***, **, and * denotes significance at the 1%, 5%, and 10% level, respectively.

TABLE 4
Unrecognized DTA: Incentives for Earnings Management in t_0

Dependent var.:		(1)	(2)	(3)	(4)	(5)	(6)
Δ UDTA%	*predicted:*	BelowIBES	Smoothing	BigBath	BelowIBES	Smoothing	BigBath
INCENTIVE	*(-), (-), (+)*	-0.0870***	-0.0679***	0.0943***	-0.1240	-0.0427	0.1515
		(-8.05)	(-6.43)	(3.19)	(-0.96)	(-0.34)	(0.44)
Δ FUTURE	*(-)*	-0.0061***	-0.0063***	-0.0058***	-0.0004***	-0.0004***	-0.0004***
		(-5.15)	(-5.29)	(-4.83)	(-5.54)	(-5.54)	(-5.53)
EARN	*(-)*	-0.0156	-0.0139	-0.0148	-0.0348	-0.0337	-0.0342
		(-1.42)	(-1.26)	(-1.33)	(-0.29)	(-0.28)	(-0.28)
Δ MTB	*(-)*	-0.0085**	-0.0098***	-0.0091**	-0.0002	-0.0002	-0.0002
		(-2.32)	(-2.66)	(-2.43)	(-0.10)	(-0.10)	(-0.09)
DISTRESS	*(+)*	0.0847***	0.0846***	0.0239	0.1583	0.1457	0.0639
		(5.28)	(5.22)	(1.14)	(0.83)	(0.76)	(0.26)
STRATEGY	*(-)*	0.0042	-0.0032	0.0040	-0.0062	-0.0065	-0.0046
		(0.20)	(-0.15)	(0.19)	(-0.12)	(-0.12)	(-0.09)
PASTROA	*(-)*	0.4052***	0.3778***	0.3560**	0.3851	0.3351	0.3308
		(2.85)	(2.65)	(2.48)	(0.25)	(0.21)	(0.21)
ZSCORE	*(-)*	-0.0107**	-0.0125***	-0.0094*	0.0223	0.0211	0.0240
		(-2.21)	(-2.58)	(-1.93)	(0.40)	(0.38)	(0.43)
Δ TAX RATE	*(-)*	0.0369	-0.0488	0.0141	-2.1060	-2.1873	-2.1395
		(0.15)	(-0.19)	(0.06)	(-0.70)	(-0.73)	(-0.71)
Observations		2,112	2,112	2,112	2,112	2,112	2,112
Adj. R-sq		0.0592	0.0488	0.0346	0.0234	0.0230	0.0230
Industry Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes

This table presents results from fixed effects OLS regressions estimating equation (1). Columns (1) to (3) include winsorized data, columns (4) to (6) do not. The dependent variable is *Δ UDTA%*, the changing unrecognized DTA from t_{-1} to t_0, scaled by total DTA. Detailed definitions on the dependent and all independent variables is presented in Appendix 1. Standard errors are robust to heteroscedasticity. T statistics are given in parentheses. ***, **, and * denotes significance at the 1%, 5%, and 10% level, respectively.

TABLE 5
Unrecognized DTA TLCF: Incentives for ETR Management in t_0

Dependent var.:		(1)	(2)	(3)	(4)	(5)	(6)
Δ UDTA TLCF%	*predicted:*	AboveIBES	Smoothing	BigBath	AboveIBES	Smoothing	BigBath
INCENTIVE	*(-), (-), (+)*	-0.0024	-0.0211	0.0386	-0.0725	-0.0630	0.0707
		(-0.17)	(-1.49)	(1.30)	(-1.51)	(-1.33)	(0.84)
Δ FUTURE	*(-)*	0.0015	0.0016	0.0015	0.0000	0.0000	0.0000
		(0.94)	(1.00)	(0.93)	(0.08)	(0.09)	(0.05)
EARN	*(-)*	-0.0080	0.0037	-0.0081	-0.0161	-0.0076	-0.0135
		(-0.45)	(0.21)	(-0.45)	(-0.29)	(-0.13)	(-0.24)
Δ MTB	*(-)*	-0.0129***	-0.0125**	-0.0125**	-0.0002	-0.0001	-0.0001
		(-2.65)	(-2.55)	(-2.55)	(-0.18)	(-0.13)	(-0.08)
DISTRESS	*(+)*	0.0283	0.0305	0.0230	0.0195	0.0138	0.0137
		(1.28)	(1.37)	(1.02)	(0.26)	(0.18)	(0.18)
STRATEGY	*(-)*	0.0082	0.0172	-0.0201*	0.0100	0.0098	0.0043
		(0.28)	(0.58)	(-0.56)	(0.50)	(0.48)	(0.21)
PASTROA	*(-)*	0.2563	0.2483	0.2865	0.2816	0.2876	0.3812
		(1.29)	(1.25)	(1.43)	(0.46)	(0.46)	(0.61)
ZSCORE	*(-)*	-0.0200***	-0.0204***	-0.0198***	-0.0025	-0.0037	-0.0030
		(-2.90)	(-2.96)	(-2.87)	(-0.11)	(-0.16)	(-0.13)
Δ TAX RATE	*(-)*	-0.0142	-0.0507	0.0004	-1.0389	-1.0447	-0.9950
		(-0.04)	(-0.14)	(0.00)	(-0.87)	(-0.86)	(-0.83)
Observations		1,866	1,846	1,857	1,866	1,846	1,857
Adj. R-sq		0.0194	0.0213	0.0198	-0.0018	-0.0023	-0.0026
Industry Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes

This table presents results from fixed effects OLS regressions estimating equation (3). Columns (1) to (3) include winsorized data, columns (4) to (6) do not. The dependent variable is *Δ UDTA TLCF%*, the changing unrecognized DTA TLCF from t_{-1} to t_0, scaled by total DTA TLCF. Detailed definitions on the dependent and all independent variables is presented in Appendix 1. Standard errors are robust to heteroscedasticity. T statistics are given in parentheses. ***, **, and * denotes significance at the 1%, 5%, and 10% level, respectively.

TABLE 6
Unrecognized DTA: Incentives for ETR Management in t_0

Dependent var.:		(1)	(2)	(3)	(4)	(5)	(6)
Δ UDTA%	*predicted:*	AboveIBES	Smoothing	BigBath	AboveIBES	Smoothing	BigBath
INCENTIVE	*(-), (-), (+)*	-0.0115	-0.0213**	0.0249	-0.2301*	-0.2143*	0.0861
		(-1.09)	(-2.06)	(1.13)	(-1.89)	(-1.78)	(0.40)
Δ FUTURE	*(-)*	-0.0059***	-0.0058***	-0.0059***	-0.0004***	-0.0004***	-0.0004***
		(-4.87)	(-4.85)	(-4.89)	(-5.50)	(-5.45)	(-5.52)
EARN	*(-)*	-0.0153	-0.0137	-0.0151	-0.0365	-0.0383	-0.0332
		(-1.37)	(-1.23)	(-1.35)	(-0.30)	(-0.32)	(-0.28)
Δ MTB	*(-)*	-0.0089**	-0.0086**	-0.0085**	-0.0004	-0.0002	-0.0002
		(-2.38)	(-2.29)	(-2.28)	(-0.16)	(-0.10)	(-0.07)
DISTRESS	*(+)*	0.0677***	0.0666***	0.0622***	0.1440	0.1196	0.1296
		(4.19)	(4.10)	(3.79)	(0.77)	(0.63)	(0.68)
STRATEGY	*(-)*	-0.0028	0.0030	-0.0256	-0.0003	-0.0007	-0.0121
		(-0.13)	(0.14)	(-0.98)	(-0.01)	(-0.01)	(-0.22)
PASTROA	*(-)*	0.3427**	0.3542**	0.3625**	0.2145	0.2366	0.3936
		(2.38)	(2.45)	(2.50)	(0.14)	(0.15)	(0.25)
ZSCORE	*(-)*	-0.0103**	-0.0107**	-0.0102**	0.0247	0.0211	0.0222
		(-2.11)	(-2.19)	(-2.10)	(0.44)	(0.37)	(0.40)
Δ TAX RATE	*(-)*	0.0024	-0.0010	0.0137	-2.2667	-2.1889	-2.1346
		(0.01)	(-0.00)	(0.05)	(-0.76)	(-0.72)	(-0.71)
Observations		2,113	2,093	2,104	2,113	2,093	2,104
Adj. R-sq		0.0305	0.0307	0.0297	0.0246	0.0243	0.0230
Industry Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes

This table presents results from fixed effects OLS regressions estimating equation (4). Columns (1) to (3) include winsorized data, columns (4) to (6) do not. The dependent variable is *Δ UDTA%*, the changing unrecognized DTA from t_{-1} to t_0, scaled by total DTA. Detailed definitions on the dependent and all independent variables is presented in Appendix 1. Standard errors are robust to heteroscedasticity. T statistics are given in parentheses. ***, **, and * denotes significance at the 1%, 5%, and 10% level, respectively.

TABLE 7
Prediction Regressions for Control Groups – *UDTA TLCF%*

Dependent variable:		(1)	(2)	(3)	(4)	(5)	(6)
UDTA TLCF%	*predicted:*	BelowIBES	Smoothing	BigBath	BelowIBES	Smoothing	BigBath
FUTURE	*(-)*	-0.0016***	-0.0008***	-0.0008***	-0.0000**	-0.0000**	-0.0000***
		(-5.61)	(-2.64)	(-4.37)	(-2.26)	(-2.24)	(-2.84)
EARN	*(-)*	0.0563	-0.0123	0.0272	0.0375	-0.0157	0.0216
		(0.96)	(-0.27)	(1.44)	(0.61)	(-0.35)	(1.23)
MTB	*(-)*	0.0043	-0.0093*	-0.0054*	0.0048	-0.0086**	-0.0004
		(0.46)	(-1.90)	(-1.89)	(0.55)	(-2.15)	(-1.24)
DISTRESS	*(+)*	0.1234*	0.1751***	0.1005***	0.1204	0.1844***	0.1041***
		(1.74)	(2.59)	(3.45)	(1.59)	(2.72)	(3.56)
STRATEGY	*(-)*	-0.1587	0.1175	-0.0064	-0.1374	0.0828	-0.0102
		(-1.52)	(1.28)	(-0.17)	(-1.49)	(1.01)	(-0.27)
PASTROA	*(-)*	1.1502	1.0745***	0.5291**	0.9283	0.6997**	0.2748
		(1.65)	(2.72)	(2.25)	(1.34)	(2.29)	(1.44)
ZSCORE	*(-)*	-0.0267	-0.0026	0.0102	-0.0173	0.0080	0.0144**
		(-1.26)	(-0.20)	(1.38)	(-0.77)	(0.63)	(2.00)
Δ TAX RATE	*(-)*	-0.6742	-0.3529	-0.8800**	-0.8745	-0.3186	-0.9080**
		(-0.75)	(-0.55)	(-2.29)	(-0.92)	(-0.50)	(-2.35)
Observations		259	478	1,564	259	478	1,564
Adj. R-sq		0.2021	0.0709	0.0661	0.1084	0.0676	0.0584
Industry Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes

This table presents results from fixed effects OLS regressions estimating equation (5). Columns (1) to (3) include winsorized data, columns (4) to (6) do not. The dependent variable is *UDTA TLCF%*, the end-of-period unrecognized DTA TLCF scaled by total DTA TLCF. Detailed definitions of the dependent and all independent variables are presented in Appendix 1. Standard errors are robust to heteroscedasticity. T statistics are given in parentheses. ***, **, and * denotes significance at the 1%, 5%, and 10% level, respectively.

TABLE 8
Prediction Regressions for Control Groups – *UDTA%*

Dependent variable:		(1)	(2)	(3)	(4)	(5)	(6)
UDTA%	*predicted:*	BelowIBES	Smoothing	BigBath	BelowIBES	Smoothing	BigBath
FUTURE	*(-)*	0.0005**	0.0016***	0.0008***	0.0000	0.0000	0.0000
		(2.06)	(6.39)	(5.21)	(1.03)	(0.96)	(0.93)
EARN	*(-)*	0.0170	-0.0322	0.0240*	0.0248	-0.0122	0.0250*
		(0.34)	(-0.88)	(1.76)	(0.50)	(-0.32)	(1.96)
MTB	*(-)*	-0.0005	0.0035	-0.0072***	0.0038	0.0023	-0.0001
		(-0.06)	(0.81)	(-2.85)	(0.50)	(0.65)	(-0.23)
DISTRESS	*(+)*	0.1560**	0.0898	0.0844***	0.1489**	0.0655	0.0836***
		(2.44)	(1.49)	(3.47)	(2.29)	(1.04)	(3.41)
STRATEGY	*(-)*	-0.1500	0.0018	-0.0300	-0.1246	-0.0042	0.0040
		(-1.59)	(0.02)	(-0.94)	(-1.64)	(-0.11)	(0.65)
PASTROA	*(-)*	-0.7291	-1.7272***	-1.3526***	-0.7742	-1.1295***	-1.3817***
		(-1.24)	(-5.14)	(-6.76)	(-1.48)	(-4.17)	(-8.55)
ZSCORE	*(-)*	-0.0372**	-0.0025	-0.0044	-0.0415**	-0.0179	-0.0093
		(-2.07)	(-0.22)	(-0.72)	(-2.34)	(-1.60)	(-1.56)
Δ TAX RATE	*(-)*	0.1323	0.0427	-0.4670	0.1778	0.0264	-0.4426
		(0.18)	(0.08)	(-1.45)	(0.24)	(0.05)	(-1.36)
Observations		283	502	1,756	283	502	1,756
Adj. R-sq		0.3918	0.3123	0.2553	0.3862	0.2493	0.2378
Industry Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes

This table presents results from fixed effects OLS regressions estimating equation (6). Columns (1) to (3) include winsorized data, columns (4) to (6) do not. The dependent variable is *UDTA%*, the end-of-period unrecognized DTA, scaled by total DTA. Detailed definitions of the dependent and all independent variables are presented in Appendix 1. Standard errors are robust to heteroscedasticity. T statistics are given in parentheses. ***, **, and * denotes significance at the 1%, 5%, and 10% level, respectively.

TABLE 9
Prediction Error Classification per Country – *UDTA TLCF%*

Incentive:	**BelowIBES**			**Smoothing**			**BigBath**		
Country:	N	Lower UDTAT-LCF	p	N	Lower UDTAT-LCF	p	N	Higher UDTAT-LCF	p
Austria	10	60%	0,3770	12	83%	0,0193	1	0%	1,0000
Belgium	26	15%	1,0000	16	19%	0,9979	1	100%	0,5000
Denmark	40	70%	0,0083	21	52%	0,5000	4	75%	0,3125
Finland	31	52%	0,5000	21	62%	0,1917	4	75%	0,3125
France	166	45%	0,9066	107	50%	0,5766	16	56%	0,4018
Germany	167	51%	0,4385	121	52%	0,3581	22	45%	0,7383
Ireland	15	40%	0,8491	7	57%	0,5000	1	0%	1,0000
Italy	24	38%	0,9242	14	64%	0,2120	3	33%	0,8750
Luxembourg	8	88%	0,0352	9	67%	0,2539	3	33%	0,8750
Netherlands	65	74%	0,0001	37	81%	0,0001	3	0%	1,0000
Norway	22	55%	0,4159	20	80%	0,0059	1	100%	0,5000
Poland	5	20%	0,9688	5	100%	0,0313	1	0%	1,0000
Portugal	3	0%	1,0000	6	83%	0,1094	1	0%	1,0000
Spain	30	50%	0,5722	18	78%	0,0154	4	25%	0,9375
Sweden	117	72%	0,0000	71	65%	0,0085	3	67%	0,5000
Switzerland	109	61%	0,0173	62	56%	0,1871	2	100%	0,2500
United Kingdom	265	56%	0,0326	164	53%	0,2412	31	42%	0,8595
Total	**1,103**	**55%**	**0,0002**	**711**	**58%**	**0,0000**	**101**	**47%**	**0,7869**

This table presents an overview of prediction error classification counts per country, based on our estimates of *UDTA TLCF%*. N denotes the total number of firm-year observations holding the respective earnings management incentive. P-values depict the binomial probability that the true prevalence of the relevant prediction error classification is greater than or equal to the observed prevalence, given a probability of 50%.

TABLE 10
Prediction Error Classification per Country – *UDTA%*

Incentive:	**BelowIBES**			**Smoothing**			**BigBath**		
Country:	N	Lower UDTA	p	N	Lower UDTA	p	N	Higher UDTA	p
Austria	11	27%	0,9673	15	47%	0,6964	2	100%	0,2500
Belgium	30	23%	0,9993	25	20%	0,9995	2	50%	0,7500
Denmark	52	40%	0,9368	28	43%	0,8275	5	80%	0,1875
Finland	44	39%	0,9519	29	55%	0,3555	3	0%	1,0000
France	204	48%	0,7356	127	45%	0,8930	18	56%	0,4073
Germany	164	52%	0,3482	124	58%	0,0438	17	35%	0,9283
Ireland	24	63%	0,1537	11	55%	0,5000	1	0%	1,0000
Italy	29	41%	0,8675	19	47%	0,6762	7	57%	0,5000
Luxembourg	8	88%	0,0352	9	44%	0,7461	3	67%	0,5000
Netherlands	67	81%	0,0000	37	68%	0,0235	3	0%	1,0000
Norway	27	33%	0,9739	22	27%	0,9915	1	100%	0,5000
Poland	10	20%	0,9893	5	20%	0,9688	2	0%	1,0000
Portugal	3	100%	0,1250	6	83%	0,1094	1	0%	1,0000
Spain	36	64%	0,0662	22	73%	0,0262	6	17%	0,9844
Sweden	137	77%	0,0000	82	77%	0,0000	4	25%	0,9375
Switzerland	132	50%	0,5347	72	67%	0,0032	2	50%	0,7500
United Kingdom	309	47%	0,8947	192	38%	0,9997	34	53%	0,4321
Total	**1,287**	**52%**	**0,0661**	**825**	**52%**	**0,2017**	**111**	**46%**	**0,8287**

This table presents an overview of prediction error classification counts per country, based on our estimates of *UDTA%*. N denotes the total number of firm-year observations holding the respective earnings management incentive. P-values depict the binomial probability that the true prevalence of the relevant prediction error classification is greater than or equal to the observed prevalence, given a probability of 50%.

TABLE 11

Reversals Depending on Prediction Error Classification per Country – *UDTA TLCF%*

Incentive:	**BelowIBES**					**Smoothing**					**BigBath**				
	HigherUDTATLCF		LowerUDTATLCF			HigherUDTATLCF		LowerUDTATLCF			HigherUDTATLCF		LowerUDTATLCF		
Country:	N	Reversal	N	Reversal	p	N	Reversal	N	Reversal	p	N	Reversal	N	Reversal	p
Austria	3	100%	5	80%	0,4076	0	0%	8	88%		0	0%	1	0%	
Belgium	17	41%	2	50%	0,8111	8	50%	1	100%	0,3428	0	0%	0	0%	
Denmark	9	44%	22	59%	0,4570	7	71%	8	38%	0,1888	3	33%	1	100%	0,2482
Finland	10	70%	13	85%	0,3996	3	67%	9	78%	0,7003	2	50%	1	0%	0,3865
France	58	60%	58	78%	0,0448	29	69%	36	75%	0,5889	2	100%	5	20%	0,0533
Germany	51	61%	68	72%	0,1947	30	73%	40	68%	0,5982	5	60%	8	50%	0,7249
Ireland	6	17%	4	50%	0,2598	1	0%	4	50%	0,3613	0	0%	1	0%	
Italy	7	57%	7	14%	0,0943	2	50%	6	50%	1,0000	1	100%	2	100%	
Luxembourg	1	0%	4	100%	0,0253	2	50%	4	100%	0,1213	1	0%	1	0%	
Netherlands	6	67%	39	69%	0,8995	4	50%	21	62%	0,6560	0	0%	3	100%	
Norway	6	50%	9	89%	0,0952	4	50%	12	83%	0,1824	0	0%	0	0%	
Poland	3	33%	1	100%	0,2482	0	0%	3	67%		0	0%	1	100%	
Portugal	0	0%	0	0%		0	0%	3	100%		0	0%	0	0%	
Spain	12	67%	10	80%	0,4844	2	100%	10	70%	0,3711	0	0%	2	50%	
Sweden	18	56%	65	58%	0,8251	15	53%	34	62%	0,5800	0	0%	1	100%	
Switzerland	30	67%	51	67%	1,0000	17	59%	24	63%	0,8121	1	0%	0	0%	
United Kingdom	77	49%	104	80%	0,0000	49	57%	57	75%	0,0458	8	75%	10	70%	0,8139
Total	**314**	**56%**	**462**	**71%**	**0,0000**	**173**	**62%**	**280**	**70%**	**0,0874**	**23**	**61%**	**37**	**57%**	**0,7534**

This table presents an overview of reversal incidence depending on prediction error classification per country, based on our estimates of *UDTA TLCF%*. N denotes the respective number of firm-year observations classified as HigherUDTATLCF or LowerUDTATLCF. P-values relate to Pearson Chi^2-tests, testing independence between prediction error classification and reversal incidence. Note that the observation counts differ from their equivalents in table 10, as, due to the reversal definition, only observations up to and including 2018 are taken into account.

TABLE 12

Reversals Depending on Prediction Error Classification per Country – *UDTA%*

Incentive:	**BelowIBES**					**Smoothing**					**BigBath**				
	HigherUDTA		LowerUDTA			HigherUDTA		LowerUDTA			HigherUDTA		LowerUDTA		
Country:	N	Reversal	N	Reversal	p	N	Reversal	N	Reversal	p	N	Reversal	N	Reversal	p
Austria	5	40%	3	33%	0,8504	5	80%	5	60%	0,4902	2	100%	0	0%	
Belgium	18	56%	4	25%	0,2689	15	67%	2	50%	0,6431	0	0%	0	0%	
Denmark	25	68%	13	31%	0,0285	13	77%	5	20%	0,0265	4	50%	1	100%	0,3613
Finland	22	45%	13	92%	0,0056	10	60%	10	80%	0,3291	0	0%	3	33%	
France	73	68%	69	72%	0,6043	43	74%	33	82%	0,4429	5	60%	4	50%	0,7642
Germany	57	68%	60	70%	0,8533	32	63%	40	75%	0,2526	3	67%	6	33%	0,3428
Ireland	6	0%	8	50%	0,0404	2	0%	3	33%	0,3613	0	0%	1	100%	
Italy	9	78%	8	0%	0,0011	3	100%	7	57%	0,1753	2	0%	3	100%	0,0253
Luxembourg	1	100%	4	75%	0,5762	4	75%	2	100%	0,4386	1	0%	1	0%	
Netherlands	9	44%	37	78%	0,0426	9	44%	16	69%	0,2338	0	0%	3	100%	
Norway	13	54%	7	86%	0,1541	14	71%	4	75%	0,8882	0	0%	0	0%	
Poland	5	60%	2	100%	0,2899	3	67%	0	0%		0	0%	2	50%	
Portugal	0	0%	0	0%		0	0%	3	100%		0	0%	0	0%	
Spain	9	44%	13	77%	0,1195	4	75%	9	67%	0,7638	0	0%	2	50%	
Sweden	23	61%	73	62%	0,9470	14	50%	43	65%	0,3129	1	100%	1	100%	
Switzerland	52	69%	47	70%	0,9154	16	69%	33	64%	0,7243	1	0%	0	0%	
United Kingdom	114	55%	102	79%	0,0002	77	62%	50	74%	0,1723	11	73%	9	67%	0,7686
Total	**441**	**61%**	**463**	**70%**	**0,0036**	**264**	**66%**	**265**	**70%**	**0,2513**	**30**	**60%**	**36**	**61%**	**0,9267**

This table presents an overview of reversal incidence depending on prediction error classification per country, based on our estimates of *UDTA%*. N denotes the respective number of firm-year observations classified as HigherUDTA or LowerUDTA. P-values relate to Pearson Chi^2-tests, testing independence between prediction error classification and reversal incidence. Note that the observation counts differ from their equivalents in table 11, as, due to the reversal definition, only observations up to and including 2018 are taken into account.

TABLE 13
Determinants of Earnings Management – *EM Pattern A*

Dependent variable: *EM PATTERN A*	(1) *UDTA TLCF%* BelowIBES	(2) *UDTA%* BelowIBES	(3) *UDTA TLCF%* Smoothing	(4) *UDTA TLCF%* BelowIBES	(5) *UDTA%* BelowIBES	(6) *UDTA TLCF%* Smoothing
SIZE	1.243***	1.086	1.211**	1.221***	1.070	1.174*
	(2.92)	(1.25)	(2.06)	(2.61)	(1.01)	(1.69)
GROWTH	0.999	0.997	1.003	0.999	0.997	1.002
	(-0.17)	(-0.75)	(0.62)	(-0.21)	(-0.55)	(0.57)
ROA	1.031**	1.002	1.012	1.028*	1.005	1.012
	(2.26)	(0.20)	(0.69)	(1.95)	(0.40)	(0.67)
LEVERAGE	1.016***	1.002	1.015**	1.015***	1.000	1.015**
	(3.21)	(0.40)	(2.40)	(3.02)	(0.10)	(2.41)
DEBTMATURITY	0.990**	0.983***	1.000	0.989**	0.981***	0.998
	(-2.04)	(-4.05)	(0.03)	(-2.15)	(-4.28)	(-0.26)
BOARDSIZE	0.989	1.004	0.925**	0.996	1.021	0.927**
	(-0.45)	(0.17)	(-2.53)	(-0.13)	(0.81)	(-2.27)
BOARD_IND	1.000	0.997	1.003	1.002	0.996	1.004
	(0.08)	(-1.01)	(0.56)	(0.45)	(-0.97)	(0.80)
MANAGEMENT_SC	1.003	1.001	0.995	1.004	1.001	0.994
	(0.87)	(0.36)	(-1.25)	(1.18)	(0.46)	(-1.40)
STRATEGIC_INV	0.993*	1.008**	0.993	0.994	1.009**	0.992
	(-1.74)	(2.17)	(-1.36)	(-1.35)	(2.36)	(-1.63)
WWGI	1.067***	1.049***	1.012	1.076***	1.036**	1.024
	(3.67)	(3.21)	(0.58)	(3.34)	(1.98)	(0.88)
DISCLOSURE	1.011	0.997	0.946	1.221**	1.131	1.039
	(0.34)	(-0.09)	(-1.34)	(2.05)	(1.42)	(0.31)
LGDP	1.682	0.563	1.323	4.410	0.535	7.017
	(0.68)	(-0.92)	(0.34)	(1.09)	(-0.57)	(1.09)
GDPGROWTH	0.907**	1.026	0.974	0.912*	1.041	0.938
	(-2.35)	(0.73)	(-0.53)	(-1.94)	(0.97)	(-1.12)
TTR				1.053**	1.044*	1.040
				(2.09)	(1.93)	(1.23)
LCF_TIMELIMIT				2.831**	2.480*	1.166
				(2.00)	(1.91)	(0.24)
LCF_MINTAX				1.403	0.758	1.201
				(1.30)	(-1.21)	(0.55)
LOSSCARRYBACK				0.769	0.936	1.053
				(-1.27)	(-0.37)	(0.21)
TAXMORALE				58.17**	37.44**	5.931
				(2.32)	(2.32)	(0.81)
Observations	999	1165	635	986	1147	621
Pseudo R-sq	0.105	0.056	0.076	0.111	0.062	0.079
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

This table presents odds-ratios from fixed effects logit regressions estimating equations (7) and (9). Columns (1) to (3) present odds-ratios relating to equation (7), columns (4) to (6) relate similarly to equation (9). The dependent variable is *EM Pattern A*, a dummy variable that takes the value 1 if a firm-year holds the respective earnings management incentive and is classified as LowerUDTA(TLCF). Detailed definitions of the dependent and all independent variables are presented in Appendix 1. Standard errors are robust to heteroscedasticity. t statistics are given in parentheses. ***, **, and * denotes significance at the 1%, 5%, and 10% level, respectively.

TABLE 14
Determinants of Earnings Management – *EM Pattern AB*

Dependent variable: *EM PATTERN AB*	(1) *UDTA TLCF%* BelowIBES	(2) *UDTA%* BelowIBES	(3) *UDTA TLCF%* Smoothing	(4) *UDTA TLCF%* BelowIBES	(5) *UDTA%* BelowIBES	(6) *UDTA TLCF%* Smoothing
SIZE	1.361***	1.211**	1.232*	1.306***	1.185**	1.221
	(3.55)	(2.35)	(1.72)	(2.99)	(2.02)	(1.59)
GROWTH	1.005	1.007	1.008	1.004	1.006	1.006
	(0.83)	(1.13)	(0.90)	(0.73)	(0.96)	(0.74)
ROA	1.022	0.978	1.000	1.015	0.979	0.987
	(1.31)	(-1.38)	(0.02)	(0.86)	(-1.30)	(-0.52)
LEVERAGE	1.009	0.994	1.014*	1.009	0.993	1.014*
	(1.56)	(-1.11)	(1.81)	(1.44)	(-1.24)	(1.77)
DEBTMATURITY	0.995	0.986**	1.006	0.995	0.985***	1.003
	(-0.81)	(-2.57)	(0.72)	(-0.81)	(-2.78)	(0.41)
BOARDSIZE	0.956	0.951*	0.892***	0.955	0.960	0.869***
	(-1.54)	(-1.72)	(-2.73)	(-1.40)	(-1.26)	(-3.00)
BOARD_IND	1.005	1.003	1.008	1.005	1.001	1.008
	(1.15)	(0.60)	(1.23)	(1.02)	(0.14)	(1.29)
MANAGEMENT_SC	0.998	0.995	0.995	1.000	0.995	0.994
	(-0.52)	(-1.52)	(-1.05)	(-0.10)	(-1.29)	(-1.19)
STRATEGIC_INV	1.002	1.006	1.008	1.003	1.007	1.006
	(0.40)	(1.38)	(1.13)	(0.50)	(1.49)	(0.80)
WWGI	1.040*	1.044**	0.955	1.083***	1.076***	0.961
	(1.85)	(2.16)	(-1.60)	(2.77)	(2.73)	(-1.04)
DISCLOSURE	1.024	0.990	1.021	1.252*	1.142	1.007
	(0.59)	(-0.27)	(0.37)	(1.88)	(1.15)	(0.04)
LGDP	1.229	0.286	12.97**	2.293	0.287	25.59
	(0.22)	(-1.44)	(2.12)	(0.45)	(-0.78)	(1.20)
GDPGROWTH	0.975	1.030	1.082	1.052	1.092	1.077
	(-0.33)	(0.47)	(0.55)	(0.62)	(1.13)	(0.45)
TTR				1.054*	1.036	1.036
				(1.85)	(1.30)	(0.91)
LCF_TIMELIMIT				4.017**	3.564**	0.603
				(2.27)	(2.06)	(-0.57)
LCF_MINTAX				2.023**	1.456	0.921
				(2.36)	(1.32)	(-0.19)
LOSSCARRYBACK				1.274	1.472*	1.217
				(1.01)	(1.70)	(0.62)
TAXMORALE				45.38*	17.84	13.70
				(1.77)	(1.39)	(0.88)
Observations	695	812	395	686	800	386
Pseudo R-sq	0.056	0.054	0.102	0.069	0.067	0.102
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

This table presents odds-ratios from fixed effects logit regressions estimating equations (8) and (10). Columns (1) to (3) present odds-ratios relating to equation (8), columns (4) to (6) relate similarly to equation (10). The dependent variable is *EM Pattern AB*, a dummy variable that takes the value 1 if a firm-year holds the respective earnings management incentive, is classified as LowerUDTA(TLCF) and followed by a reversal in t_{+1} or t_{+2}. Detailed definitions of the dependent and all independent variables are presented in Appendix 1. Standard errors are robust to heteroscedasticity. t statistics are given in parentheses. ***, **, and * denotes significance at the 1%, 5%, and 10% level, respectively.

Appendix

Appendix 1: Variable Definitions

UDTA TLCF%	Unrecognized deferred tax assets on tax loss carryforwards, divided by total deferred tax assets on tax loss carryforwards
Δ UDTA TLCF%	Change in unrecognized deferred tax assets on tax loss carryforwards from t_{-1} to t_0, divided by total deferred tax assets on tax loss carryforwards
UDTA%	Unrecognized deferred tax assets, divided by total deferred tax assets
Δ UDTA%	Change in unrecognized deferred tax assets from t_{-1} to t_0, divided by total deferred tax assets
BelowIBES	Dummy variable 1, if pre-managed profit lower than profit forecasts
$AboveIBES^{ETR}$	Dummy variable 1, if pre-managed ETR higher than ETR forecasts
Smoothing	Dummy variable 1, if pre-managed profit in t_0 lower than profit in t_{-1}
$Smoothing^{ETR}$	Dummy variable 1, if pre-managed ETR in t_0 higher than ETR in t_{-1}
BigBath	Dummy variable 1, if loss within 50% highest losses (only loss years)
$BigBath^{ETR}$	Dummy variable 1, if ETR within 10% highest ETRs (only positive ETRs)
FUTURE	Deferred tax liabilities divided by total deferred tax assets
Δ FUTURE	Change in *FUTURE* from t_{-1} to t_0, divided by total deferred tax assets
EARN	The average operating income over the respective year and the two preceding years scaled by total assets
MTB	Number of shares issued multiplied by market value on balance sheet date (price close), divided by total equity
Δ MTB	Change in *MTB* from t_{-1} to t_0
DISTRESS	Dummy variable 1, if the firm's operating cash flow, operating income or after-tax profit is negative
STRATEGY	The firm's effective tax rate reported in the annual report's income tax footnote
PASTROA	The average return on assets over the previous three years
ZSCORE	Altman's (1968) Z-Score based on Shumway's (1997) updated coefficients

Δ TAX RATE	Change in corporate tax rate[9] of the parent company from t_0 to t_{+1}
Pre-managed Profit	Profit increased by change in unrecognized deferred tax assets (on tax loss carryforwards)
Pre-managed ETR	ETR increased by change in unrecognized deferred tax assets (on tax loss carryforwards) of tax reconciliations[10]
SIZE	Natural logarithm of a firm's total assets
GROWTH	Measure of a firm's growth opportunities, computed as the percentage change in sales (multiplied with 100 in order to facilitate a percentage point change interpretation of odds-ratios)
ROA	Measure of a firm's operating efficiency regardless of its financial structure, computed by dividing a firm's net income prior to financing costs by total assets (and multiplied with 100 in order to facilitate a percentage point change interpretation of odds-ratios)
LEVERAGE	Measure of the capital structure of a firm, computed as the ratio of total liabilities to total assets (and multiplied with 100 in order to facilitate a percentage point change interpretation of odds-ratios)
DEBTMATURITY	Measure of the debt maturity structure of a firm, computed as the ration of total current liabilities to total liabilities (and multiplied with 100 in order to facilitate a percentage point change interpretation of odds-ratios)
BOARDSIZE	Total number of board members at the end of the fiscal year
BOARD_IND	Percentage of independent board members as reported by the company (and multiplied with 100 in order to facilitate a percentage point change interpretation of odds-ratios)
MANAGEMENT_SC	Refinitiv Management Score, measures a company's commitment and effectiveness towards following best practice corporate governance principles (ranges from 0 to 100)
STRATEGIC_INV	Percentage of shares held by strategic entities (multiplied with 100 in order to facilitate a percentage point change interpretation of odds-ratios)
WWGI	A country's average percentile rank of the world bank's six "Worldwide Governance Indicators" (Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption, all ranging from 0 to 100)

[9] We collect corporate tax rates for all required years via OECD (2022).

[10] For our sample, we hand-collect both the ETR and all tax reconciliation items, categorized among others into deferred taxes.

DISCLOSURE	Business extent of the world bank's disclosure index (Measures the extent to which investors are protected through disclosure of ownership and financial information in a given country. The index ranges from 0 to 10, with higher values indicating more disclosure)
LGDP	Natural logarithm of the GDP per capita based on purchasing power parity (constant 2017 international USD), collected from the world bank's "World Development Indicators" database
GDPGROWTH	Annual percentage growth rate of GDP at market prices based on constant local currency, collected from the world bank's "World Development Indicators" database (values are percentages multiplied with 100)
TTR	Statutory corporate income tax rate of the group parent company OECD (2022) (multiplied with 100 in order to facilitate a percentage point change interpretation of odds-ratios)
LCF_TIMELIMIT	Dummy variable indicating the existence of a time limit (dummy 1) for tax loss carryforwards in a given country (following Dressler & Overesch, 2013)
LCF_MINTAX	Dummy variable indicating the existence of a minimum taxation regime (dummy 1) for tax loss carryforwards in a given country (following Dressler & Overesch, 2013)
LOSSCARRYBACK	Dummy variable indicating the existence of a carryback option of losses (dummy 1) for tax purposes in a given country (following Dressler & Overesch, 2013)
TAXMORALE	Country-specific marginal effects measure of tax morale report by Alm & Torgler (2006)

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