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How do corporate tax rates alter conforming tax avoidance?

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How Do Corporate Tax Rates Alter Conforming Tax Avoidance?

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ABSTRACT

We examine an international panel of domestic firms to quantify the degree to which conforming tax avoidance changes with statutory tax rates. We derive an alternative estimation method that identifies conforming tax avoidance from the variation of tax rates over time and across countries. We incorporate a series of validation tests by considering an alternative measure of conforming tax avoidance, investigating alternative channels for this type of tax avoidance, and showing a more pronounced response to tax rates when a country observes a significant increase in conformity between its book and tax reporting. Overall, we find a 1-percentage point decrease in the corporate tax rate corresponds with a 1.5 percent increase in pre-tax book income in domestic firms, which we interpret as a substantial conforming tax avoidance response by these firms. We also provide preliminary evidence that this type of activity plays a role in multinational firms.

Keywords: conforming tax avoidance, tax avoidance, international tax, book-tax conformity

Availability of data and material: This paper uses data from publicly available sources (Bureau van Dijk's Amadeus, Compustat Global Fundamentals, the World Bank, and KPMG tax rates).

JEL Classification: H25, H26

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I. INTRODUCTION

Across the globe, corporate statutory tax rates have fallen in recent decades (OECD 2019). Policymaker discussion and academic research on the consequences of such policies often focus either on the reallocation of jobs and investment ("real" activity) or the shifting of taxable income across jurisdictions (e.g., OECD/G20 Inclusive Framework on Base Erosion Profit Shifting (BEPS); Slemrod 1995; Desai et al. 2004; Williams 2018). In this study, we complement this evidence by seeking greater understanding of an important but understudied consequence of tax rate changes: their influence on conforming tax avoidance and the level of consolidated profit for financial reporting ("book" earnings). In particular, we quantify the degree to which domestic firms manipulate consolidated pre-tax book earnings via conforming tax avoidance and examine circumstances that alter this response by firms. Examining this consequence is important because (1) it provides information on a form of tax avoidance that is hard to identify, (2) adjustments to consolidated profits with conforming tax avoidance can make reported firm performance (earnings) less informative for researchers and investors and (3) conforming tax avoidance is available not only to multinationals but also to domestic firms that do not have access to cross-border profit shifting. A 2018 report by the OECD reported that domestic firms represents 72 percent of firm activity contributing to global GDP and 77 percent of global employment. Thus, a deeper understanding of conforming tax avoidance conducted by domestic firms is important in its own right. Nevertheless, we also expand our tests to consider whether this type of activity contributes to the tax avoidance of multinational firms.

Firms can avoid taxes in a variety of ways, which the tax accounting literature has broadly categorized into two different buckets: conforming and nonconforming tax avoidance (Hanlon and Heitzman (2010)). Conforming tax avoidance occurs when a firm achieves a lower tax liability that also requires a similar reduction in both "book" earnings

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reported to the public and taxable income reported to the tax authorities. In contrast, nonconforming tax avoidance occurs with reductions in tax liabilities when these values diverge. As a result, conforming tax avoidance comes with a unique trade-off. If a firm wants to reduce its tax burden, it must also report lower book income. Correspondingly, if a firm wants to manipulate its book earnings upward, it may incur a higher tax burden (Erickson et al. 2004). In Appendix 1, we provide additional detail on the scope for conforming tax avoidance activity we examine in this study and how this corresponds with the scope of conforming tax avoidance discussed in prior literature.

When corporate tax rates change, this alters the incentives of firms. Lower tax rates reduce benefits of conforming tax avoidance, making accounting methods that increase both book earnings *and* taxable earnings more attractive. Yet, it is unclear to what degree firms actually inflate earnings to respond to tax rate changes via conforming tax avoidance for two reasons. First, early evidence for conforming tax avoidance often focused on one technique for conforming tax avoidance, intertemporal shifting of reported earnings, and was limited to examining a single tax event in the U.S. (the Tax Reform Act (TRA) of 1986) (Scholes et al. 1992; Guenther 1994; Maydew 1997) [2] where it is not clear whether results would generalize to different periods or firms in other countries.[3] Second, existing studies in the literature that investigate a broader scope of conforming tax avoidance (e.g., Badertscher et al. 2019) do not examine this activity in periods when tax rates vary or how

[2] Most of the early studies are related to the TRA of 1986 that simultaneously altered other tax policies expected to influence reported earnings (implemented uniform capitalization rules and eliminated the allowance method for bad debts (Guenther 1994), increased the capital gains tax (Porcano 1997), closed the gap between capital gains and ordinary income tax rates as well as dividend tax rates (Scholes et al. 2015), reduced the ability to defer U.S. tax on overseas financial services income of U.S. firms (Altshuler and Hubbard 2003), and expanded the Alternative Minimum Tax (AMT) (Gramlich 1991; Manzon 1992; Guenther 1994; Boynton et al. 1992)). This limitation also holds for other studies focused on a single event as changes in tax rates often interact with changes in tax bases, business cycles, and other policy measures.

[3] The external validity of a single event is always subject to concern as tax bases, accounting standards, and the degree of book-tax conformity are often country and period-specific and can reasonably be expected to alter the response of reported earnings to tax incentives. Therefore, to derive a robust average estimate of the impact of tax rate changes on book income, we rely on multiple events in an international setting.

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it evolves when the conformity of financial accounts and tax accounts (book-tax conformity) varies with jurisdictions.

To investigate these questions and fill this gap in the literature, we exploit changes in statutory tax rates for an international panel of entities[4] in 24 European countries over 2005-2020 using unconsolidated data on from Bureau van Djik's Amadeus database. Thus, similar to Beuselinck et al. (2019), we use data at the unconsolidated level to study an earnings management strategy that alters consolidated earnings. We focus our primary analysis on domestic firms because this gives a cleaner setting to distinguish conforming tax avoidance from alternative avoidance strategies (e.g., cross-jurisdiction profit shifting). We then employ a generalized difference-in-differences (DiD) framework and estimate the effect of tax rate changes on pre-tax book income, isolating this effect from idiosyncratic time-invariant country, industry, and firm characteristics, along with time-varying firm and country level features shown to influence earnings in prior literature.

Overall, we find that when jurisdictions lower their statutory tax rates, entities respond by inflating pre-tax book income, indicative of a reduction in conforming tax avoidance behavior. Further, the economic magnitude of this response is substantial. Results suggest that for the average entity in our sample, a decrease in the statutory tax rate by 1 percentage points relates to reporting a 1.5 percent higher pre-tax book income. To put this into perspective, when Germany (the Netherlands) cut tax rates by roughly 9 percentage points in 2008 (4 percentage points in 2007), average pre-tax book income would increase by 12.5 percent (5.8 percent) due to a reduction in conforming tax avoidance. Or, as an alternative comparison in the U.S., the Tax Cuts and Jobs Act lowered the federal statutory tax rate by 14 percentage points (35 to 21 percent). If U.S. firms responded similarly to what

[4] We use the term "entity" throughout to refer to the unconsolidated firm unit in a consolidated firm ownership structure. Our sample includes both parent and subsidiary entities within a consolidated firm structure.

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we observe with our European analysis, this would suggest U.S. firms inflate pre-tax book income by about 18.7 percent.

Supporting our identifying assumptions, we find that entities in countries with and without tax rate changes trend similarly in their pre-tax book income before tax rate changes. We also verify that the results are not driven by definitional distinctions for activities considered outside the scope of conforming tax avoidance discussed in Appendix 1 (i.e., adjustments in investment) and are robust to a wide range of alternative specifications and control variables. Additionally, we perform a series of tests to investigate potential for bias in staggered DiD analysis (e.g., de Chaisemartin and D'Haultfoeuille 2020; Goodman-Bacon 2021; Baker et al. 2022) and find evidence that our results are not likely of concern in our setting. For example, we verify the main results are similar when using a stacked cohort design that is robust to this issue.

We perform several additional tests to validate that our results reflect conforming tax avoidance. First, we investigate whether variations in the demand for non-tax earnings management may alternatively explain the results above. In this analysis, we use six proxies to identify instances with abnormally high demand for earnings management. The first four proxies are motivated by Burgstahler et al. (2006) and Van Tendeloo and Vanstraelen (2008) that use these proxies to examine broader (non-tax specific) reporting incentives in European firms. The last two proxies help us evaluate whether shifts in economic growth or firm reliance on debt alternatively explain our results. Overall, our baseline results are robust to validation tests for earnings management. Whether we exclude high earnings-management observations or control directly for earnings-management proxies, we find results qualitatively and quantitatively similar to those in our main analysis.

We then perform three additional tests that lend further support to our interpretations of the main analysis as conforming tax avoidance. First, we re-estimate our analysis using

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an alternative measure of conforming tax avoidance by Badertscher et al. (2019). We continue to find the expected negative association between statutory tax rates and this alternative measure. Second, we confirm that our approach measuring conforming tax avoidance reflects alternative channels for conforming tax avoidance also examined as validation tests in Badertscher et al. (2019). In particular, our results reflect the use of (1) discretionary expenditures (via cash flow) and (2) discretion with accounting to engage in tax-induced earnings management. Finally, we show that pre-tax book income becomes more responsive to changes in tax rates if the entity's resident country has a significant increase in conformity between its book and tax reporting. This result supports the prediction that greater book-tax conformity may increase the set of opportunities available for conforming tax avoidance.

In additional analysis, we consider preliminary tests for the role of conforming tax avoidance in multinational firms. We re-estimate our main analysis for this group and continue to find the negative association between tax rates and pre-tax book income. However, because an alternative tax avoidance strategy, cross-jurisdiction profit shifting (or a reallocation of income) in response to tax rate incentives is also consistent with this result for multinational firms, we do not attempt to quantify the extent of conforming tax avoidance with the multinational sample. Instead, we incorporate two additional tests simply to assess whether it is reasonable to expect that a tax-induced manipulation of consolidated earnings via conforming tax avoidance contributes at least in part to these estimates. We show that the results are similar when controlling for where else income could be shifted within Europe or when limiting the analysis to firms without subsidiaries in tax havens. Combined with the evidence in our primary analysis for domestic firms, this provides an initial indication that this alternative tax avoidance strategy could play a role in estimates for a design commonly used to evaluate profit-shifting in multinational firms.

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These findings should be of interest to future research focused on quantifying either of type of response to tax rates with multinational firms.

In addition to the policy relevance discussed above, this study contributes to four streams of accounting literature: 1) conforming tax avoidance, 2) heterogeneity in firm responses to tax rate changes, 3) book-tax conformity, and 4) cross-jurisdiction profit-shifting. First, prior literature documents particular techniques for conforming tax avoidance that shift transactions across periods surrounding particular tax law changes (Scholes et al. 1992; Guenther 1994; Maydew 1997; Roubi and Richardson 1998; Dobbins et al. 2018). A related literature examines the role of financial and tax reporting incentive trade-offs within specific transactions.[5] Our study fills a gap in this literature by isolating the effect of tax rates on conforming tax avoidance from other tax and non-tax features more generally.

Our study also provides an alternative methodology to Badertscher et al. (2019) for how researchers can study and quantify conforming tax avoidance. While we validate our approach with their conforming tax avoidance measure, their analysis takes a different approach focused on tax burden implications of conforming tax avoidance (i.e., the product of the tax rate and tax base) while we focus on the effect of tax rates on the tax base (pre-tax book income). While a tax burden measure is reasonable in settings where statutory tax rates are constant, which holds for federal tax rates in the U.S. period examined in Badertscher et al. (2019), the tax base approach has an advantage in settings where statutory tax rates vary and where researchers are interested in how firms respond to tax policy with adjustments to tax bases. This advantage arises because variation in tax rates between jurisdictions and over time create an automatic change in the explicit tax liability absent any adjustment by the firm to its tax base. This makes it difficult to distinguish and quantify the

[5] These include public or private operation decisions (Penno and Simon 1986), option dispositions (Matsunaga et al. 1992), aggressive tax positions (Cloyd et al. 1996), divestitures (Klassen 1997), or option grants (Klassen and Mawani 2000).

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tax base response by firms with a tax burden measure. Thus, a tax base approach is advantageous in our setting. A further advantage of our approach is that it is not subject to recent critiques with the use of residual measures as dependent variables (Chen et al. 2018).

Second, our findings complement Markle et al. (2020), who focus on changing prices (pre-tax returns) in response to tax rate changes using a sample of single-country European firms. Their findings suggest that this response is concentrated among closed economies where greater costs with international trade are likely to make prices sensitive to investment (those outside the EU, primarily Russia and the Ukraine). In contrast, we provide evidence of conforming tax avoidance in response to tax rate changes for entities in open border countries (EU countries). This evidence dovetails with Markle et al. (2020) by documenting evidence of conforming tax avoidance where they find implicit taxes to be less relevant. Combined, the results from both studies provide evidence for a more nuanced understanding of the alternative responses firms have to changes in tax rates.

Our research also fills a gap in prior literature that examines the costs and benefits of book-tax conformity (Guenther et al. 1997; Hanlon and Shevlin 2005; Hanlon et al. 2008; Hanlon and Maydew 2009; Atwood et al. 2010). While this literature suggests that book-tax conformity can affect different attributes of book earnings (e.g., its persistence or informativeness) directly, we instead analyze how book-tax conformity *interacts with* changes in statutory tax rates to affect conforming tax avoidance. The results fill a void in this literature by providing evidence for a second channel through which conformity can influence reported earnings, indirectly by amplifying the effect of alternative policies (statutory tax rate changes) on the level of reported earnings.[6]

[6] Guenther et al. (1997) use the switch from the cash method to the accrual method for certain firms with the U.S. Tax Reform Act of 1986 to assess the implications of greater book-tax conformity for the shifting of income from a high-tax period to a low-tax period. However, the results do not allow an inference about how greater conformity altered the sensitivity of reported book income to the level of statutory tax rates, one of the later questions we examine in our analysis. Atwood et al. (2012) examine the effect of book-tax conformity

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Finally, we contribute to the literature on cross-jurisdiction profit-shifting (e.g., Markle 2016; De Simone et al. 2017). Our results suggest that associations between tax rates and pre-tax book income may not solely reflect cross-jurisdiction profit shifting. Complementing Blouin and Robinson (2020), the results in our paper suggest another reason why inferences from unconsolidated accounting data might overestimate profit-shifting behavior. While we do not attempt to quantify the degree of conforming tax avoidance response in multinationals, our results suggest that a negative association between tax rates and pre-tax book income could also reasonably capture an alternative taxpayer response that does not correspond with a reallocation of income across jurisdictions. At the same time, our results suggest that the Cobb-Douglas transformation commonly used in the public economics and accounting literatures to examine cross-jurisdiction profit shifting in multinational firms offers future researchers an opportunity to investigate alternative (conforming) tax avoidance strategies in domestic firms.

II. PRIOR LITERATURE AND HYPOTHESIS DEVELOPMENT

Literature on conforming tax avoidance

Tax avoidance is often defined broadly as any reduction to a firm's explicit taxes (Dyreng et al. 2008; Hanlon and Heitzman 2010). Most measures of tax avoidance do not allow for examination of *conforming* tax avoidance (Hanlon and Heitzman 2010). In particular, two common measures of tax avoidance are GAAP effective tax rates (GAAP ETRs) and cash effective tax rates (Cash ETRs). Both use a measure of tax liabilities divided by (adjusted) pre-tax book income. However, ETRs do not allow for inferences about conforming tax avoidance because conforming strategies reduce both the numerator (tax burden) and the denominator (book income). Hence, conforming tax avoidance cancels out

on a measure of *non-conforming* tax avoidance but do not focus on the interactive effect of book-tax conformity with statutory tax rates nor do they focus on the implications for *conforming* tax avoidance, the outcome of interest in our study.

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in an ETR. A third common tax avoidance measure relates to using book-tax differences. However, conforming tax avoidance that affects book and taxable income similarly would be differenced out of this measure as well.

Much of the prior literature that examines conforming tax avoidance focuses on a single technique for this type of avoidance, intertemporal shifting of reported earnings, and uses tax law changes surrounding a single tax reform, like the U.S. Tax Reform Act of 1986 (henceforth, "the TRA"), to assess whether firms shifted various pre-tax book income accounts across time periods in response to this reform. In particular, Scholes et al. (1992) examine the shifting of gross profits and selling, general, and administrative expenses surrounding the TRA. Alternatively, Guenther (1994) examines shifting of accruals, and Maydew (1997) analyzes shifting of non-recurring versus recurring revenues and expenses for firms with net operating losses.[7] Other research examines intertemporal shifting related to tax incentives in a single country (Watrin et al. (2012) and Dobbins et al. (2018) for Germany; Lin et al. (2014) for China; Sundvik (2016) for Sweden; Kubick et al. (2021) for the U.S. with the TCJA) or for a particular type of firm in a subset of countries (Roubi and Richardson (1998) for nonmanufacturing firms in Canada, Malaysia, and Singapore; Coppens and Peek (2005) for private firms in eight European countries; Hoopes et al. (2020) for private firms relative to public firms in the U.S.).

Two recent studies broaden examination of conforming tax avoidance beyond a focus on intertemporal income shifting. Hundsdoerfer and Jacob (2019) focus on one particular channel for conforming tax avoidance, manipulation of operating costs in response to external shocks to sales, but consider a broader panel of European countries to investigate this strategy. In particular, they investigate the asymmetric response of tax

[7] Boynton et al. (1992), Dhaliwal and Wang (1992), Manzon (1992), Lopez et al. (1998) and Calegari (2000) provide evidence of certain conforming tax avoidance techniques before the TRA 1986. Other studies examine how certain characteristics alter the degree of specific conforming tax avoidance.

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avoidance through this channel to contribute to the management accounting literature on cost stickiness. Conversely, Badertscher et al. (2019) examine a broader scope for conforming tax avoidance more in line with the scope examine in our study (see the discussion in Appendix 1 for additional detail). They develop a measure of conforming tax avoidance more generally with U.S. firms to capture the broader tax implications of strategies to manipulate book earnings. Their measure is the residual or unexplained variation in total worldwide explicit tax liabilities (as proxied by the ratio of cash taxes paid to lagged total assets) when regressed on proxies for *nonconforming* tax avoidance (e.g., book-tax differences) and other firm attributes. They use this measure to show that public firms and firms with high capital market pressure are less active in conforming tax avoidance than private firms and firms with low capital market pressure.

Hypothesis development

In this study, we investigate how statutory tax rates alter reported book earnings via conforming tax avoidance. In Appendix 1, we outline the scope of different activities that contribute to the broader construct of conforming tax avoidance we examine and how that corresponds with the definition of conforming tax avoidance in the literature. For all types of conforming tax avoidance strategies discussed, the incentive to manipulate book income downward increases with the statutory corporate income tax rate. Conversely, we expect that as statutory tax rates have typically fallen in recent decades that firms will engage in less conforming tax avoidance and be more willing to report higher book income given tax costs with this activity decline. Thus, we state this in the hypothesis below.

> **H1**: Firms adjust pre-tax book income in response to statutory tax rates via conforming tax avoidance.

Alternative sources of tension with this prediction are discussed in prior literature (e.g., Badertscher et al. 2019; Jacob and Hundsdoerfer 2019). In particular, the financial reporting cost with manipulating book income and non-tax operational cost of conforming

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tax avoidance may deter firms from engaging in conforming tax avoidance more generally. Thus, conforming tax avoidance may not be worthwhile for many firms to begin with and lower tax benefits as tax rates fall would not alter their behavior. Examples of costs with conforming tax avoidance include debt covenant violations or compensation contract concerns that are often influenced by reported book income. Further, operational costs with adjusting pre-tax book income could entail customer concerns because adjustments to this type of tax avoidance strategy could require altering the timing of sales or deliveries. The important role of these costs is shown in prior literature, which finds evidence that public firms with high capital market pressure engage in lower levels of conforming tax avoidance than private firms (e.g., Penno and Simon 1986; Cloyd et al. 1996; Badertscher et al. 2019; Hoopes et al. 2020). Finally, conforming tax avoidance is not the only opportunity for firms to respond to tax rate changes. For example, they may be more likely to respond by adjusting *non-conforming* tax avoidance strategies that do *not* alter pre-tax book income. Thus, it is unclear to what extent firms respond to tax rate changes by adjusting pre-tax book income with conforming tax avoidance.

III. RESEARCH DESIGN AND SAMPLE

Identification of conforming tax avoidance

As an identification strategy for conforming tax avoidance, we rely on changes in tax incentives, reflected by changes in statutory corporate tax rates in an international setting. Thus, our identification strategy can be interpreted as a generalized difference-in-differences (DiD) strategy with changes in statutory tax rates. We assume that the normal ("true") economic profit of an entity absent tax incentives is a function of capital assets, labor input, and productivity in line with the literature on cross-jurisdiction profit shifting by Grubert and Mutti (1991), Hines and Rice (1994), and Huizinga and Laeven (2008). This approach uses a natural log transformation of the Cobb-Douglas production function to

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explain normal profits.[8] We then include the corporate statutory tax rate in the entity's resident jurisdiction to capture the tax incentive to alter pre-tax book earnings as this is the rate that the entity would apply to the unmanaged tax base (pre-tax book income) absent manipulation of earnings. This results in the following model:

$$\begin{aligned} Log\ PTI_{i,t} = {} & \beta_0 + \beta_1 Tax\ Rate_{j,t} + \beta_2 Log\ Assets_{i,t} + \beta_3 Log\ Compensation_{i,t} \\ & + \beta_4 Log\ GDP_{j,t} + \beta_5 Log\ GDP\ per\ Capita_{j,t} + \alpha_i + \gamma_t + \varepsilon_{i,t}, \end{aligned} \quad (1)$$

where the dependent variable is the natural logarithm of pre-tax book income ($Log\ PTI_{i,t}$) for entity i in country j and year t. $Tax\ Rate_{j,t}$ is the top statutory corporate income tax rate in entity i's resident jurisdiction j in year t. If entities manipulate their book earnings in response to tax rates in line with prior literature on conforming tax avoidance (e.g., Guenther 1994; Maydew 1997), we expect that the coefficient on $Tax\ Rate_{j,t}$ (β_1) will be negative. The natural logarithms of total assets ($Log\ Assets_{i,t}$) and employee compensation expense ($Log\ Compensation_{i,t}$) proxy for capital and labor. These controls also help to account for changes in real business activity (e.g., investment) that might be affected by tax policy.

We include additional controls from prior literature. The logarithms of GDP and GDP per capita ($Log\ GDP_{j,t}$ and $Log\ GDP\ per\ Capita_{j,t}$) proxy for the size of the economy and productivity in a country. Finally, to account for time-invariant features of the entity (and thus also the firm), we include entity, i.e., firm fixed effects (α_i). We also include year fixed effects (γ_t) to account for variation in macroeconomic conditions over time. In an alternative specification, we replace firm fixed effects with country fixed effects and industry fixed effects at the two-digit level and add dummy variables as in De Simone (2016) to account for differences in accounting rules and financial reporting incentives for parents ($Parent_i$) as well as for listed firms ($Public_i$). We also alternatively consider the

[8] In our baseline analysis (Table 4), we also consider whether the exclusion of firm level controls for capital and labor alter our estimates with this analysis and find similar results.

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addition of group fixed effects to account for time-invariant characteristics membership within a group of entities. We cluster standard errors at the country–industry level, with industry based on one-digit SIC codes to have a sufficiently large number of clusters.

Equation (1) uses a continuous treatment variable, $Tax\ Rate_{i,t}$, often referenced as a "dosage intensity" treatment, to estimate the generalized DiD analysis. This design offers several important advantages for our particular research question. First, our interest is in quantifying the response (elasticity) of book income to tax rates, which is a continuous concept that some argue can only be estimated accurately with continuous estimation (Hendren 2016). Thus, we use a continuous tax rate treatment variable rather than constrain the response estimate to a tax rate decrease binary variable that does not take into account the size of the tax rate change.[9] A dosage intensity approach provides a weighted average effect of a one percentage point "dose" of statutory tax rate adjustment based on the varied response to specific tax rate adjustments during our sample period in comparison to when firms have no adjustment in tax rates. Further, we extend the traditional two period, two group DiD to a staggered DiD to allow for additional counterfactuals in comparison with our "treated" firms (those with tax rate adjustments in the current period) and to enhance the generalizability of our estimates beyond a single event. This approach is common in research that uses international variation to address concerns that spurious circumstances unique to a particular change in regulation or policy explain the results (e.g., Christensen, Hail, and Leuz 2013; Christensen, Hail, and Leuz 2016; Leuz and Wysocki 2016).

[9] In Table 5, we also evaluate a binary $Tax\ Rate\ Decrease_{i,t}$ treatment variable and find similar results in terms of sign and statistical significance. Wooldridge (2005, p. 132), Angrist and Pischke (2008, 234), and Angrist and Imbens (1995) explain how the traditional two-way fixed effects model extends to these types of dosage intensity interpretations. The importance of a "dosage intensity" analysis has also been advocated for making causal inferences in evaluating medical treatment. Sir Austin Bradford Hill, a pioneer in the study for smoking and cancer, advocated this type of design for the ability to make causal inferences for medicine in his address to the Royal Society of Medicine – Hill 1965.

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More generally, the objective of a DiD design is to provide a better (more comparable) counterfactual. The traditional two-period, two-group DiD typically limits the control group to one that has not been treated around the event in comparison to a treated group before and after a single treatment period. An underlying assumption is that the treatment and control group would have evolved similarly had the treatment not occurred and that there are no confounding events in that single period that explain the divergent trends. However, policies often are not randomly assigned, raising questions about how appropriate it is to focus solely on groups that are never selected for the treatment in the sample period as the sole counterfactual or benchmark. Further, focusing on a single treatment event raises questions about the role of alternative spurious events during that period and the generalizability of inferences. For this reason, researchers often use multiple treatment periods and incorporate those who will be treated in later periods ("not yet treated") as part of the control group. A benefit of this approach is that those "not yet treated" may arguably evolve more similarly to the treated group than the "never treated."[10]

However, recent research suggests that there can be a potential downside or trade-off alongside these advantages with the extended (staggered) DiD approach. In particular, while inclusion of those "not yet" treated firms in the analysis may offer an opportunity for a more comparable counterfactual, retaining treated firms in the analysis once they have been treated can inject negative weights into the weighted average estimate of the treatment effect (ATT). This especially becomes a concern if the role of negative weights in the weighted average is so large that it leads to an estimate that is of the opposite sign than the true treatment effect (see examples of this discussion in de Chaisemartin and

[10] This kind of advantage is often put forward with designs interested in using multi-jurisdictional or multi-cohort implementation periods with regulations, standards, and tax policies (e.g., state securities fraud statutes (Agrawal 2013), securities/reporting regulation internationally (Christensen, Hail, and Leuz 2016 and discussed in summarizing the advantage of staggered implementations for this literature on p. 585 in Leuz and Wysocki (2016)), reporting of uncertain tax positions to the IRS (Jacob, Wentland, and Wentland 2022)).

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D'Haultfœuille 2020; Goodman-Bacon 2021; Baker et al. 2022). We conduct additional analysis and diagnostics to assess the potential for negative weights to bias our results (Table 5 and Online Appendix Figure A1). Results from these tests suggest that it is unlikely to be a concern for our estimates.

Sample selection and descriptive statistics

We use unconsolidated financial statement and ownership data for European companies from 2005 to 2020 from Bureau van Dijk's Amadeus database. Amadeus contains detailed financial statement and ownership information for European firms. The ownership information is classified in 2013 (the middle of our sample period) and provides information on worldwide shareholdings of European parents. We begin by restricting the sample to EU-domiciled parents ("global ultimate owners", GUOs) and their EU-28 domiciled subsidiaries with a company name, accounting, and active status data.[11] We then remove firms that are inactive, in regulated industries (financial and insurance institutions), where parent versus subsidiary classification is unclear, and where status as a multinational versus domestic firm is unclear.[12] We require complete data for accounting variables based on local GAAP data[13] and on a majority of shareholders. We further exclude observations with implausible values (e.g., with negative assets), losses, or total assets of less than $500,000 (micro firms). These sample adjustments ensure that our sample firms have sufficient incentives and economic resources for conforming tax avoidance.

[11] We selected firms from all countries that were members of the European Union in 2013. Due to data restriction requirements (see Table 1, Panel A), the final sample comprises observations from all EU-28 countries except Cyprus, Greece, Lithuania, and Malta.

[12] We define a parent and its subsidiaries as domestic if the parent does not hold any stake in any firm that is settled abroad (even with very small international shareholdings). In line with the literature on international income shifting (e.g., Huizinga and Laeven 2008), we classify firms as MNEs if either the parent or at least one of its majority-owned subsidiaries is located in another country than other group members. We exclude all observations of minority shareholdings, i.e. where the parent does not hold more than 50 percent.

[13] The number of observations with unconsolidated IFRS reporting is relatively low in the dataset and the distribution does not correspond to the distribution of economic activity in Europe. Further, to take advantage in cross-country variation in book rules as they contribute to book-tax conformity, we exclusively utilize data with local GAAP that has more variation in book reporting across European countries.

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Given we cluster standard errors at the country–industry level (industry based on one-digit SIC codes), we require that we have at least 30 observations for each country-industry combination. Finally, we limit our analysis to domestic entities where interpretations for our analysis are clearer (i.e., cannot correspond with profit-shifting across jurisdictions). This results in a sample of 554,839 entity observations in 24 EU member states, where 191,506 observations relate to parent entities (GUOs) and 363,333 to subsidiary entities. We provide a detailed breakdown of our sample construction process in Table 1, Panel A. Table 1, Panel B reports observations by country. A higher number of observations is located in Belgium, Denmark, France, Germany, Italy, Spain, Sweden, and the United Kingdom. Apart from Belgium, Denmark, and Sweden, this should be driven by the economic role of these countries, which is common in studies using Amadeus data (De Simone 2016; Markle et al. 2020). In contrast, we observe smaller subsets of observations in Austria, Croatia, Estonia, Hungary, Ireland, Latvia, Luxembourg, Portugal, Slovakia and Slovenia. Overall, the country breakdown broadly corresponds to the distribution of economic activity and the reporting requirements in Europe.

We report the statutory corporate tax rates that include the top federal rates as well as average local taxes and surtaxes by country and year in Table 2. Tax rates are taken from KPMG (2006) and KPMG's corporate tax rate tables.[14] Consistent with the idea that tax rates are generally decreasing over time, more than half of the European countries in our sample (19) have at least one tax rate decrease whereas only a few of these countries (4) have at least one tax rate increase of at least 0.5 percentage points. Corporate statutory tax rates in our sample vary between 9.0 percent (Hungary) and 38.4 percent (Germany).

[14] https://home.kpmg/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html.

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Finally, we report descriptive statistics for the full sample of domestic entities, the subsidiaries subsample, and the parents subsample in Table 3, Panels A, B, and C, respectively. Entities in the domestic sample are neither held nor have any shareholdings of entities in another country. Note that our data provides information on shareholdings on a global basis, which enables us to clearly identify domestic and multinational firms. The average pre-tax book income, total assets, and total employee compensation in the full domestic sample (Panel A) are $1 million, $13.6 million, and $2.5 million, respectively.

IV. RESULTS

Baseline results on conforming tax avoidance

We report estimates for eq. (1) in Table 4 columns (1)-(4), where we vary the set of fixed effects used across columns. Consistent with firms reporting higher pre-tax book income in response to lower tax rates, which we interpret as a reduction in conforming tax avoidance, we observe a negative coefficient estimate on $Tax\ Rate_{j,t}$ across columns (1)-(4) with statistical significance at the 1 percent level. Given results are similar across columns, we use the default specification from eq. (1) with firm and year fixed effects for remaining columns in the table.

In terms of economic magnitude with eq. (1) (column 2), we observe a coefficient estimate of -1.483. This coefficient represents a semi-elasticity and describes the percentage change in the dependent variable resulting from a percentage point change in the tax rate. Thus, a decrease in the corporate tax rate by one percentage point is associated with a decrease in book income by 1.47 percent. Due to the logarithmic specification, this relative effect also accounts for non-linearity.[15] Hence, a 10-percentage point decrease in the firm's corporate tax rate corresponds with firms reporting a 13.8 percent inflation in pre-tax book

[15] Due to our logarithmic dependent variable, magnitude interpretations are calculated by exponentiating the coefficient estimate. This estimate corresponds with col. (2) in Table 4 with a 1 percentage point tax rate change, where 100×(exp(-1.483×(0.01/1))-1)= -1.47%.

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income.[16] Also in our other specifications, we find similar semi-elasticities ranging from 1.43 (with firm and group fixed effects) to 1.69 (with country and industry fixed effects).[17]

In columns (5) and (6) of Table 4, we consider whether altering the scope of activity we allow to flow through our estimates with *Tax Rate*$_{i,t}$ alters our results. In particular, we re-estimate eq. (1) with two different extremes for how to consider the role of investment and real business activity within these estimates to evaluate whether a broader definition of conforming tax avoidance that encompasses tax-motivated adjustments to investment substantively alters our estimates. First, in column (5) of Table 4, we exclude the firm level controls for assets and compensation to allow additional investment for these activities to flow through our estimates with the *Tax Rate*$_{i,t}$ variable. Then, in column (6) of Table 4, we turn to the other extreme where we more specifically control for investment and fixed assets as opposed to using the broader total asset and compensation controls from eq. (1). Given that the coefficients in columns (5) and (6) are relatively similar to the range of estimates as those in columns (1)-(4), this suggests that the broader inferences and takeaways from the analysis are not fundamentally altered by this definitional distinction. As a result, we maintain our default approach in eq. (1) and control for capital and labor to be consistent with prior literature on tax avoidance. Nevertheless, the slightly higher coefficient estimate in column (5) is consistent with the idea that lower taxes might also boost real firm activity (investment), which may result in a moderate additional increase in pre-tax book income.

In Appendix 1, we define the scope for the types of activity we expect to capture with conforming tax avoidance in line with prior literature (e.g., Hanlon and Heitzman 2010; Jacob 2022; Badertscher et al. 2019). In that discussion, we explain that, even though

[16] To account for a 10 percentage point tax rate change, this calculation for col. (2) is 100×(exp(-1.483×(0.10/1))-1)= 13.8%.
[17] These estimates correspond with col. (4) and (1), respectively, in Table 4 with a 1 percentage point tax rate change, where 100×(exp(-1.441×(0.01/1))-1)= -1.43% and 100×(exp(-1.706×(0.01/1))-1)= -1.69%.

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additional investment prompted by lower tax burdens might have a conforming effect on both book and taxable income, this activity is generally treated as outside the scope (a separate outcome of interest) in the tax literature from conforming tax avoidance. In line with this, our eq. (1) controls for firm capital with the natural log of total assets in line with other tax avoidance studies (e.g., Badertscher et al. 2019). This approach also represents a more conservative estimate for the conforming tax avoidance response relative to a definition that also incorporates tax-motivated investment.

Parallel trends

A prerequisite of DiD analysis is that treated entities (i.e., entities with a change in tax incentives in the current period) and control entities (i.e., those without a change in tax incentives in the current period) would have had profits that trended similarly in the absence of the treatment (a tax rate change). While the common trends assumption cannot be tested directly, statistical comparisons of trends in the outcome of interest across treated and control groups before treatment periods are regarded as evidence in favor of this assumption (Fuest et al. 2018; Jacob et al. 2019).

To investigate whether treated and control entities observed common trends in earnings before a change in tax rates, we re-estimate eq. (1) by replacing $Tax\ Rate_{i,t}$ with leads for the tax rate 4 to 2 years-ahead to evaluate the differences in the fourth, third, and second year before the tax rate change. We do not include the rate for the year just prior to the tax rate change given that the prior literature on intertemporal income shifting (as one form of conforming tax avoidance activity) also would be reflected in the period just before the tax rate change (e.g., Guenther 1994; Maydew 1997). We report the coefficient estimates and confidence intervals with these variables in Figure 1 to assess whether pre-tax book income was trending differently for treated and untreated entities before the treatment. In

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support of the common trends assumption, we do not find evidence for significant differences in trends in these periods leading up to the change in tax rates.

Evaluating potential bias with a staggered DiD approach

Recent studies suggest that there can be a potential downside to the advantages outlined above with a staggered DiD design in that it may inject negative weights into weighted average estimates of the ATT (e.g., de Chaisemartin and D'Haultfœuille 2020; Goodman-Bacon 2021; Baker et al. 2022). To evaluate the potential role of bias with negative weights in our analysis, we first use de Chaisemartin and D'Haultfoeuille (2020)'s diagnostic that reports the percent of ATTs with negative weights in the analysis.[18] This diagnostic requires a binary treatment variable. As a result, with this analysis, we first focus on identifying whether and when a firm's resident country has a significant tax rate cut (defined as at least 2 percentage points) at some point during the sample period given that tax rate decreases are the more prevalent direction of statutory tax rate adjustments during our sample period (see Table 2 for tax rate dynamics in our sample period). In these binary specifications, we ignore minor tax rate changes that do not exceed 0.5 percentage points. We create four specifications for *Tax Rate Decrease*$_{i,t}$ that vary in terms of the strictness of exclusion restrictions required to be considered with the binary classification.[19] See additional detail on these measures in Appendix 2.

[18] Note that we use this rather than the Goodman-Bacon (2021) decomposition given that the de Chaisemartin and D'Haultfœuille (2020) allows for unbalanced panels (the case for our sample) and the Goodman-Bacon (2021) decomposition requires a balanced panel.

[19] In specification 1, we include control entities in countries that never have a significant tax cut and consider as treatment entities those in countries that have one significant tax rate decrease of at least 2 percentage points and no other significant tax rate changes (i.e., no changes that exceed 0.5 percentage points). Specification 2 repeats specification 1 but removes the first three years of the sample period overall (excludes 2005-2008) given that the negative weight concern is expected to be more common when early treated units stay in the sample for longer. Specification 3 considers subsample periods from all countries so that these subsamples capture only one significant tax rate cut and do not include other tax rate changes that exceed 0.5 percentage points. For example, as United Kingdom had multiple tax rate cuts, we only consider a polarized unbalanced panel that considers the years 2005 to 2008 (low tax period) and 2017 to 2020 (high-tax period) with a value of one for *Tax Rate Decrease*$_{i,t}$. Finally, Specification 4 also considers observations from countries with multiple tax rate reductions, but not from countries with tax rate increases larger than 0.5 percentage points. In the case of a country with multiple tax rate decreases, we focus on the largest tax rate reduction with regard

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In the odd columns of Table 5, we re-estimate our default analysis (Table 4 column 2) replacing the continuous *Tax Rate*$_{i,t}$ treatment variable with each of the four *Tax Rate Decrease*$_{i,t}$ specification variables, respectively, and add a row in the table reporting the percent of ATTs with negative weights using the de Chaisemartin and D'Haultfoeuille (2020)'s diagnostic. Then, in the even columns of Table 5, we re-estimate our default analysis using the continuous *Tax Rate*$_{i,t}$ with the restricted samples (countries and periods) considered with the different binary *Tax Rate Decrease*$_{i,t}$ specifications. This helps us evaluate whether the magnitudes of our estimates are significantly altered by differences in these restrictions necessary for running the diagnostic. A number of indicators from this combined analysis in Table 5 suggest that a bias with negative weights is unlikely a concern with our baseline analysis in Table 4. First, in column 1, we observe that only 23.8 percent of ATTs have a negative weight whereas Cantoni and Pons (2021, p. 2,638) use the same diagnostic and conclude that negative weights are reassuringly not a concern in their setting when "less than one-third of the weights are negative." Second, despite the variation in the degree of negative weights with ATTs and substantial differences in the sample composition and size across the columns, the magnitudes of the coefficients with the continuous *Tax Rate*$_{i,t}$ variable (the even columns) fall within a similar range as that observed in the baseline analysis with Table 4. Taken together, the results in Table 5 provide robust additional support for our original baseline interpretations with Table 4. They suggest it is unlikely that potential bias with negative weights is a concern with our estimates. Nevertheless, as an additional check, we use a stacked cohort design approach

to *Tax Rate Decrease*$_{i,t}$. Thus, *Tax Rate Decrease*$_{i,t}$.takes a value of 0 before the largest tax cut and 1 thereafter. In the case of a country with several cuts of equal size, we choose the most central cut in the observation period to obtain a similar length of the periods before and after treatment. For example, we consider 2013 as treatment year for Sweden and 2012 for the United Kingdom. This expands the sample to allow for the inclusion of entities in countries with multiple significant tax rate decreases.

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from Cengiz et al. (2019) (Stata's *stackedev* command) that is robust to this issue and verify that our main results are robust to this alternative design.

In Online Appendix Figure A1, we present a graphical representation of the results from the stacked cohort DiD design approach. Given that this design requires a binary treatment approach, we use the *Tax Rate Decrease*$_{i,t}$ specification from column 7 of Table 5 as this is closest to our baseline sample (in Table 4). The analysis reports coefficient estimates for the individual periods (pre/post) surrounding the tax rate decrease, which finds an average post-period coefficient estimate (where individual post-period estimates are equally weighted) of 0.07. Given the corresponding analysis in Table 5 column 7 is of the same sign and a similar magnitude (0.09), this corroborates our main approach.

Validation tests

Validation tests regarding earnings management

In the baseline analysis, we interpret adjustments to pre-tax book income that correspond with changes in tax rates as adjustments to a firm's conforming tax avoidance. However, a plausible alternative explanation could be that there may be shifts in demand for non-tax earnings management that correspond to periods when tax rates change. For instance, tax rate cuts may coincide with periods with a sluggish economy where firms may have more incentive in general to report higher pre-tax book earnings in those years. Alternatively, the tax rate cuts may happen to be relevant for firms with greater reliance on debt, and these firms generally tend to engage in more earnings management.

To evaluate such spurious sources of demand for earnings management as alternative explanations for our results, we use six proxies to capture instances with high demand for earnings management. We examine whether results remain robust if we exclude observations with a high likelihood for non-tax earnings management as indicated by our six proxy variables. We draw the first four proxies from Burgstahler et al. (2006) and Van

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Tendeloo and Vanstraelen (2008), who examine broader (non-tax specific) reporting incentives for European firms. These four proxy variables capture a broad set of earnings management indicators as documented by the corresponding literature. In detail, these proxies account for: (1) the tendency of firms to avoid small losses, (2) a larger use of total accruals, (3) extensive earnings smoothing relative to cash flows, and (4) a greater departure of accounting accruals from operating cash flows (for more detail see Appendix 2). The fifth and sixth proxies we use, which indicate low GDP growth and high reliance on debt, correspond with the two alternative reporting incentive explanations given above with regard to sluggish periods in the economy and greater use of debt.

In Table 6, we present analyses that use each of the six earnings management proxies above. For proxy variable EM1, we assume a high earnings management likelihood if absolute value of the profit/loss does not exceed +/- 2 percent of total assets. For all other proxy variables, we assume a high likelihood of earnings management for observations in the top quartile of the earnings management proxy. In our Online Appendix (Tables A2 and A3), we also consider alternative cut-off points (e.g., quintile) to identify observations with high earnings management likelihood.

The financial information for some firm level proxies for earnings management have limited coverage for firms in Amadeus. Hence, we evaluate the results using two approaches. In Panel A of Table 6, we re-estimate our analysis excluding only observations where we can clearly identify high earnings management likelihood with our proxy variables. Alternatively, in Panel B, we re-estimate our analysis excluding a) observations where we can clearly identify high earnings management likelihood as well as b) observations where the particular earnings management proxy cannot be calculated due to data limitations. In all columns of both panels in Table 6, we continue to find a negative coefficient estimate on $Tax\ Rate_{i,t}$, which is significant at the 1 percent level, and estimates

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generally falls in a range similar to those in the baseline analysis despite substantial variation in the sample size. Further, in Online Appendix Table A5, we take an alternative approach where we use the earnings management proxies instead as additional control variables and again find results similar to the baseline analysis. That holds even if we use all six earnings management indicators in one specification. Taken together, our analyses provide broad and robust evidence that (spurious) shifts in the demand for earnings management do not explain our main findings, supporting the original interpretation in terms of conforming tax avoidance.

Validation tests with an alternative approach from Badertscher et al. (2019)

In our baseline tests (Table 4), we interpret an increase in pre-tax *book* income that corresponds with decreases in statutory tax rates as a reduction in conforming tax avoidance. This interpretation implicitly presumes an effect on firms' tax burdens with the expectation that taxable income will have a similar response as what we observe with pre-tax book income (a book-tax conforming increase in income in response to tax rate decreases). Actual taxable income is generally not publicly reported, and estimates of taxable income are less reasonable in our setting,[20] limiting our ability to test that aspect of our assumption. While explicit tax burden measures are publicly available, as discussed earlier in the paper, the most common explicit tax burden measures used (i.e., ETRs and BTDs) do not capture conforming tax avoidance.

As a result, we consider the explicit tax burden measure for conforming tax avoidance developed and validated in Badertscher et al. (2019) to assess if we observe results in line with our baseline interpretations with this alternative approach. In column 1 of Table 7, we re-estimate our default specification from column 2 of Table 4, replacing the

[20] Estimates of taxable income are usually a representation of pre-tax book income adjusted by temporary book-tax differences grossed up by statutory tax rates (e.g., Blouin et al. 2010), which creates a mechanical relationship between this variable and out variable of interest (statutory tax rates).

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pre-tax profit dependent variable with $Conformtax_{i,t}$ where, as with other tax avoidance proxies like ETR, lower values of the variable represent additional tax avoidance. Consistent with our baseline result interpretation that firms engage in less conforming tax avoidance when statutory tax rates fall, we observe a negative coefficient on $Tax\ Rate_{i,t}$, significant at the 1 percent level.

While the analysis with Badertscher et al. (2019) enhances the credibility of our assumption with baseline interpretations, it is important to add a caveat for interpretations with regressing explicit tax measures on statutory tax rates. Explicit tax burdens are a product of tax bases (i.e., taxable income) and tax rates. Thus, absent any adjustments to tax bases in response to statutory tax rate decreases, this induces an innate positive association between explicit tax outcome measures and statutory tax rates. To demonstrate this point, in column 2 of Table 6, we report estimates from regressing the ratio of tax to assets on tax rates and find a positive coefficient, significant at the 1 percent level. This mechanical positive association results in a drawback with using an explicit tax measure more generally to distinguish and quantify how responsive base adjustments are to statutory tax rate decreases. Given that the $Conformtax_{i,t}$ measure is a residual from regressing the tax to assets ratio on book-tax differences and several other variables, this suggests the economic magnitude of the negative coefficient in column 1 of Table 7 is likely understated in representing the degree of response with conforming tax avoidance activities when statutory tax rates decrease. Therefore, our approach is more appropriate in settings with variation in tax rates.

Validation tests with different channels for CTA and changes in book-tax conformity

In the remaining columns of Table 7 (columns 3-7), we present additional tests to validate whether our approach captures conforming tax avoidance. We first consider adjustments to discretionary activity as defined in Roychowdhury (2006), which was also

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used as one of the validation tests for the conforming tax avoidance measure in Badertscher et al. (2019). Roychowdhury (2006) outlines three types of discretionary activities – those with: 1) cash flow from operations, 2) production, and 3) other expenditures encompassing advertising, research and development (R&D), and selling, general, and administrative expenses (SG&A)). We are limited to analysis with the first proxy (discretionary cash flows) given this is the only one of the three proxies with reasonable coverage in Amadeus data.[21] We report analysis with this proxy in column 3 of Table 7. Consistent with the predictions in Roychowdhury (2006) and Badertscher et al. (2019), we find a positive coefficient estimate on $Tax\ Rate_{i,t}$ significant at the five percent level. This is consistent with firms using discretion with product prices and credit terms to manage both book and taxable income upwards as tax rates decrease given the tax cost of this conforming channel for earnings management falls.

In columns 4 and 5 of Table 7, we then investigate the use of discretion with accounting to respond to changes in tax rates and find evidence that firms use this alternative channel to respond to changes in tax rates. In countries with one-book systems (that apply the same accounting for single financial statements and tax statements), individual accounts that influence earnings more broadly offer an opportunity for conforming tax avoidance (see the distinctions between one-, two-, and three-book systems for conforming tax avoidance in Europe via downward manipulation of earnings in Watrin et al. 2014). However, even in countries that use different books for financial and tax reporting purposes, there are tax incentives to better align book reporting with tax values to avoid taxes (i.e., one form of conforming tax avoidance). Most relevant, if values diverge significantly

[21] Only 9.4% of our sample report cost of goods sold and production costs required for the second proxy, and only 4.5% of our sample report advertising, R&D, and SG&A expenses required for the third proxy. Considering that we need panel data that captures tax rate variations over a period of 20 years and 24 countries and that real EM proxies in Roychowdhury (2006) are calculated on a country-industry year level, it becomes clear that our data set does not provide appropriate information for analyses with these proxy variables.

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between tax and financial reporting, this might be seen as a red flag by tax auditors that search for aggressive tax avoidance activities. Thus, firms might want to provide similar accounts for book and tax purposes to shadow their tax avoidance activities even in two-book systems.

The first account we consider, reserves, is one often associated with considerable discretion for manipulation of reported earnings. This is because the account corresponds with uncertain, future obligations (e.g., warranties, deferred compensation, as well as legal claims and assessments). Several aspects of book and tax reporting for activity in reserves allow the reported values to diverge (e.g., differences in discount rates used with estimates of future pension costs, Kiesewetter and Schätzlein, 2019). However, applying book discretion for downward manipulation of reserve costs (and, therefore, increasing earnings) may threaten the ability of the taxpayer to claim the higher costs for taxes since book numbers are publicly revealed to tax authorities as well. Said another way, a reduction in tax rates lowers the tax benefits for firms with aligning their book reporting with tax values to avoid taxes, thereby reducing conforming tax avoidance. If instead firms in both one- and two-book systems do not incorporate conforming tax incentives with book reporting of reserves, then we should not find evidence that book reserve values are responsive to tax rate changes. In line with firms using discretion with reserves to respond to changes in tax incentives with conforming tax avoidance, we find a significant, positive coefficient estimate for $Tax\ Rate_{i,t}$ in column (4) of Table 7 when we replace the dependent variable with the logarithm of tax-adjusted value of book reserves.[22] From a quantitative perspective, a 1 percentage point decrease in the statutory income tax rate corresponds with a reduction

[22] We deduct from the reported book value of reserves the expected tax reserve for income taxes before taking the logarithm of the value. Results remain widely unchanged if we use reserves that are not adjusted for tax reserves (mechanical relationship).

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in the reported book value of reserves by 1.9 percent.[23] In Table A6 of the Online Appendix, we confirm that the positive association of reserves and $Tax\ Rate_{i,t}$ is not driven by shifts in demand for non-tax earnings management.

The second account we examine is firm inventory. Even when countries follow a two-book system, the accounting treatment for certain transactions may inherently conform more than others. For example, even though U.S. uses a two-book system, it generally requires the same inventory valuation method to be used for both book and tax reporting. Badertscher et al. (2019) consider inventory valuation within the U.S. as a channel to validate their conforming tax avoidance measure. While Amadeus does not report the book inventory valuation methods used by firms (unlike how Compustat does for U.S. firms) and only infrequently reports cost of goods sold (COGS: available for only 12.6 percent of our sample), it does report book inventory balances. Thus, we use a firm's inventory balance as our second account to evaluate whether book reporting is responsive to conforming tax incentives from changes in tax rate. If some countries require (or allow) firms to use the same inventory valuation methods for book and tax purposes, then higher tax rates increase the incentive of firms to allocate more inventory cost to COGS, which reduces the inventory balance (e.g., using last-in-first-out in periods of increasing costs (LIFO) and first-in-first-out (FIFO) in periods of decreasing costs). In periods of tax rate decreases, this would reduce the tax incentive to pass more inventory costs to COGS as this results in reporting lower book earnings. By contrast, if firms can report book inventory valuation without much consequence for COGS that is deductible for tax purposes, then we should not observe that firm book inventory balances respond to adjustments in tax rates. Consistent with firms using inventory valuation methods to respond to changes in tax rates, we observe

[23] This estimate correspond with col. (4) in Table 7 with a 1 percentage point tax rate change, where $100\times(\exp(1.910\times(0.01/1))-1)= 1.9\%$.

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a negative coefficient on *Tax Rate*$_{i,t}$ significant at the 1 percent level in column (5) of Table 7. From a quantitative perspective, a 1 percentage point decrease in the statutory income tax rate increases the reported book value of inventory by 0.4 percent.[24]

In the last two columns of Table 7, we investigate whether a significant change in book-tax conformity in the entity's resident country alters how responsive pre-tax book income is to changes in tax rates. We define a change in conformity as significant if an entity's resident country with a below-average value of book-tax conformity in year *t-1* changes to have an above-average value in year *t* and vice versa. In the case of a significant increase (decrease) in book-tax conformity for a country, *BTaxC Change*$_{j,t}$ takes a value of one (minus one) and is set equal to zero otherwise. We use two measures of book-tax conformity for this analysis. The first is from Watrin et al. (2014) given they develop their measure specifically using Amadeus data and show how it corresponds with variation in one-, two-, and three-book systems in European countries. As an alternative, we also examine a measure of book-tax conformity from Tang (2015). In the last two columns of Table 7, we observe a negative coefficient estimate on the interaction of *BTaxC Change*$_{j,t}$ and *Tax Rate*$_{i,t}$ significant ate the 10 percent level or better. These results are consistent with firms being more responsive to tax incentives for conforming tax avoidance in countries with increased book-tax conformity, which is in line with the idea that greater book-tax conformity affords additional opportunities for conforming tax avoidance. Overall, the additional validation tests in Tables 6 and 7 further enhance the credibility with our interpretations of the baseline analysis as conforming tax avoidance.

[24] This estimate correspond with col. (5) in Table 7 with a 1 percentage point tax rate change, where 100×(exp(-0.380×(0.01/1))-1)= -0.4%.

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V. ADDITIONAL ANALYSIS FOR MULTINATIONAL FIRMS

Prior literature uses a similar approach of regressing pre-tax profits on statutory tax rates in multinational firms to examine cross-jurisdiction profit shifting in multinational firms (e.g., Grubert and Mutti (1991), Hines and Rice (1994), and Huizinga and Laeven (2008)). Yet, our combined analysis with domestic entities suggests that this approach can also be used to capture adjustments to consolidated pre-tax book income via conforming tax avoidance as opposed to just reallocations of profits across jurisdictions. While we do not attempt to disentangle and quantify the conforming tax avoidance response for multinationals, we conduct additional analysis with multinationals to assess whether conforming tax avoidance contributes, at least in part, to estimates for these firms with this type of design.

We report the related analysis in Table 8. Panel A of Table 8 presents descriptive statistics for the multinational sample. Table 8 Panel B then reports the regression analysis for the multinational sample. The first five columns of Panel B present baseline results for the multinational subsample with alternative fixed effects (col. 1-3) and consideration for the role of tax-motivated real business activity in estimates (col. 4-5) for multinational firms. Consistent with predictions for both a multinational profit shifting interpretation and conforming tax avoidance interpretation, we observe a negative coefficient estimate for *Tax* $Rate_{i,t}$ in these columns significant at the five percent level or better.

To assess whether these estimates can be attributed entirely to profit shifting activity, we estimate our default specification (from column (2)) under two conditions where we expect profit-shifting to play less of a role in estimates with this design. The first specification (presented in column (6)) represents estimates when accounting for any profit shifted elsewhere within the EU. We do this by adding a control variable, *Log Group* $Profit_{i,t}$, which is the logarithm of the aggregate sum of all profits of the group's entities

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excluding entity *i*'s profit. In this analysis, we are not able to account for profit-shifting to entities outside the EU given that, while Amadeus provides ownership information on a worldwide basis, the data only provides financial statement information for European entities. Thus, these estimates could still capture profit reallocated (shifted) to tax haven entities outside of Europe. For this reason, we add the final column (column (7)) where we examine the baseline analysis for multinationals only in the case where they have no subsidiaries in tax havens. In both columns (6) and (7), we continue to find a negative coefficient estimate for $Tax\ Rate_{i,t}$ significant at the 1 percent level. Further, the magnitudes of these coefficient estimates are similar to the baseline estimate for multinationals. While do not interpret the estimates from columns (6) and (7) entirely as a conforming tax avoidance response as opposed to a profit shifting interpretation, the results in Table 8 coupled with the deeper analysis with domestic entities in the remaining tables in the paper (where profit shifting is not relevant) suggest that a conforming tax avoidance response reasonably plays a role in these estimates more broadly. Thus, this plausible alternative response channel should be considered in future research using this type of design to quantify the profit-shifting response to tax rate changes.

VI. CONCLUSION

In this study, we examine the degree to which domestic firms use conforming tax avoidance to respond to changes in statutory tax rates using an international panel of domestic firms in the EU. We use a battery of tests to assess that our inferences with this specification can reasonably be attributed to the behavior we are focused on, a manipulation of consolidated earnings in response to tax rate changes (conforming tax avoidance) as opposed to broader spurious shifts in demand for (non-tax specific) earnings management. Further, we validate the analysis with an alternative proxy for conforming tax avoidance from Badertscher et al. (2019) and show it corresponds with several specific channels for

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conforming tax avoidance. While our primary analysis focuses on domestic firms, where we can more cleanly attribute estimates to conforming tax avoidance, in additional analysis, we include preliminary tests suggesting that conforming tax avoidance also plays a role for multinational firms. Hence, we make a call to future research to consider this activity in multinational firms in greater detail.

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APPENDIX 1: CONFORMING TAX AVOIDANCE ACTIVITIES

The explicit definition of conforming tax avoidance given in the literature is broad. Conforming tax avoidance is summarized as transactions that enable the firm to obtain a lower tax liability and result in a similar reduction of both "book" income and taxable income (e.g., Hanlon and Heitzman 2010; Badertscher et al. 2019). However, the approach with which prior studies discuss and analyze conforming tax avoidance helps to provide more detail for distinguishing what types of transactions are generally considered part of this avoidance activity and what alternative transactions are outside the scope examined in this stream of research.

First, prior literature on conforming tax avoidance often features examples of discretion with accounting methods to alter the timing of transactions that influence both book and taxable income in response to tax incentives (e.g., Scholes et al. 1992; Guenther 1994; Maydew 1994; the inventory valuation methods discussion in Badertscher et al. 2019).[25] A second channel for conforming tax avoidance is adjustment of discretionary expenditures to decrease both book and taxable income to avoid tax liabilities. This channel is discussed and analyzed in Appendix C of Badertscher et al. (2019) and specifically considers how firms adjust discretionary 1) cash flow from operations, 2) production, and 3) changes in other discretionary expenditures (advertising, research and development (R&D), and selling, general, and administrative expenses (SG&A)) to lower their tax liability. A third form of conforming tax avoidance discussed in the literature does not correspond with intertemporal shifting but instead involves transactions that shift book and taxable income to shareholders or other firm stakeholders (e.g., managing directors) to

[25] However, as Dobbins et al. (2018) explain, not all intertemporal income shifting constitutes conforming tax avoidance as certain intertemporal income shifting transactions do not affect book and taxable income similarly. For example, Dobbins et al. (2018) provide evidence that depreciation in tax accounts (that do not necessarily conform to book accounts) decrease significantly for a large tax cut in Germany.

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lower tax liabilities. This approach is referred to as shifting income from one pocket to another (Scholes et al. 2015).

By contrast, prior literature generally treats tax-motivated adjustments to fundamental activity like investment as a separate stream of research (construct of interest) even though, to the extent this activity affects a portion of book and taxable income similarly, it could also appear consistent with the broader definition of conforming tax avoidance. For example, in their review of different streams of the tax literature, Hanlon and Heitzman (2010) separately discuss corporate tax avoidance as topic 2 (subsection 3) vs. tax-motivated decisions with investment and other fundamental activity as topic 3 (subsection 4). Further, Jacob (2022) discusses the interaction of "tax avoidance" and "real effects of corporate taxation," such as corporate investment decisions, as separate constructs of interest in subsection 2.3 of his review of the literature on real effects of corporate taxation. In line with this approach, studies on tax avoidance often control or account for the role of this fundamental activity when examining different strategies for tax avoidance.[26] In our baseline analysis for conforming tax avoidance, we consider whether our results differ when we broaden our definition of conforming tax avoidance to allow tax-motivated investment to flow through our estimates. Given we find that estimates are relatively stable (only slightly larger with the broader definition of activity), this distinction does not appear to significantly alter inferences or takeaways from the results. Thus, to be consistent with prior literature, we focus on the bounds of conforming tax avoidance discussed with activities like those in the first three channels above and not tax-motivated adjustments to investment. This definition also presents a more conservative estimate of the conforming tax avoidance response with changes in statutory tax rates.

[26] For example, the regression-based validation tests for conforming tax avoidance in Badertscher et al. (2019) (e.g., Table 6 and Appendix C in their paper) control for the natural log of firm assets.

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APPENDIX 2: VARIABLE DESCRIPTIONS

Variable	Definition	Data Source
Dependent variables		
Log PTI$_{i,t}$	Logarithm of the pre-tax income of an entity *i* at time *t* in U.S. $.	Amadeus
Conformtax$_{i,t}$	Measure of conforming tax avoidance of an entity *i* at time *t*, which is calculated as the residual of a regression on an industry-country-year basis (NACE3) of *Tax to Lagged Assets*$_{i,t}$ on permanent book-tax differences, a dummy variable for negative permanent book-tax differences, an interaction of permanent book-tax differences and the dummy for negative permanent book-tax differences, and a dummy variable for loss firms as in Badertscher et al. (2019). Amadeus does report data on NOLs; so we cannot incorporate this feature of their analysis.	Amadeus
Discret. Cash flow	Measure for real earnings management via cash flows as suggested by Roychoudhury (2006).	Amadeus
Log Inv$_{i,t}$	Logarithm of inventory for an entity *i* at time *t* in U.S. $.	Amadeus
Log Reserves$_{i,t}$	Logarithm of the tax-adjusted reserves of an entity *i* at time *t* in U.S. $.	Amadeus
Tax to Lagged Assets$_{i,t}$	Total sum of taxes paid of entity *i* in *t* scaled by total assets in *t-1*.	Amadeus
Tax variables		
Tax Rate$_{j,t}$	The statutory corporate income tax rate of entity *i*'s country *j* at time *t* including average local and state income taxes.	KPMG
Tax Rate$_{j,t+x}$	The statutory corporate income tax rate of entity *i*'s country *j* at time *t+x* including average local and state income taxes.	KPMG
Tax Rate Decrease$_{j,t}$	The dummy variable defines the most significant reduction of the statutory corporate income tax rate of entity *i*'s country *j* within the observed period. Observations before the change are denoted by 0 and observations after the change by 1. In doing so, we generally ignore minor tax rate changes that do not exceed 0.5 percentage points and define significant tax rate decreases as a minimum reduction of 2 percentage points. In detail, we consider four specifications: In specification 1, we include control entities in countries that never have a significant tax cut and consider as treatment entities those in countries that have one significant tax rate decrease of at least 2 percentage points and no other significant tax rate changes (i.e., no changes that exceed 0.5 percentage points). Specification 2 repeats specification 1 but removes the first three years of the sample period overall (excludes 2005-2008) given that the negative weight concern is expected to be more common when early treated units stay in the sample for longer. Specification 3 considers subsample periods from all countries so that these subsamples capture only one significant tax rate cut and do not include other tax rate changes that exceed 0.5 percentage points. For example, as United Kingdom had multiple tax rate cuts, we only consider a polarized unbalanced panel that considers the years 2005 to 2008 (low tax period) and 2017 to 2020 (high-tax period with a value of one for *Tax Rate Decrease*$_{i,t}$. Finally, Specification 4 also considers observations from countries with multiple tax rate reductions, but not from countries with tax rate increases larger than 0.5 percentage points. In case of multiple tax rate decreases, we focus on the largest tax rate reduction with regard to *Tax Rate Decrease*$_{i,t}$. Thus, *Tax Rate Decrease*$_{i,t}$.takes a value of 0 before the largest tax cut and 1 thereafter. In case of several cuts with an equal size, we choose the most central cut in the observation period to obtain a similar length of the periods before and after treatment. For example, we consider as treatment year for Sweden 2013 and for the United Kingdom 2012.	KPMG
BTaxC$_{j,t}$	Book-tax conformity of entity *i*'s country *j*, measured by a scaled ranking of countries (0 = low book-tax conformity, 1= high book-tax conformity). These measures are obtained from Watrin, Ebert, and Thomsen (2014) and Tang (2015). For the calculation of the measure	Compustat Global Fundamentals / Amadeus

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	of Tang (2015), we rely on the Compustat Global Fundamental file from 2005 to 2020 while we use Amadeus data from the same period to calculate the measure of Watrin et al. (2014).	
BTaxC Change$_{j,t}$	The variable indicates a significant increase in *BTaxC*$_{j,t,}$by +1, a significant decrease in *BTaxC*$_{j,t,}$ by -1, and a year without a significant change as 0. Increases and decreases are significant if an entity's resident country with a below-average value of book-tax conformity in year *t-1* changes to have an above-average value in year *t* and vice versa.	Compustat Global Fundamentals / Amadeus
Firm level control variables		
Log Assets$_{i,t}$	Logarithm of an entity *i*'s total assets at time *t* in U.S. $. Note: In tests with reserves and inventory as the alternative outcomes of interest (Table 7 col. 4 and 5), we use assets excluding reserves and inventory, respectively, to define this variable.	Amadeus
Log Compensation$_{i,t}$	Logarithm of entity *i*'s employee compensation costs at time *t* in U.S. $.	Amadeus
Log Fixed Assets$_{i,t-1}$	Logarithm of an entity *i*'s fixed assets at time *t-1* in U.S. $.	Amadeus
Log Investment$_{i,t}$	Logarithm of an entity *i*'s investemtn at time *t* in U.S. $, defined as the sum of the change in fixed assets from *t-1* to *t* and depreciations in *t*.	Amadeus
Log Sales$_{i,t}$	Logarithm of an entity *i*'s sales at time *t* in U.S. $.	Amadeus
Log Group Profit$_{i,t}$	Logarithm of the entity *i*'s aggregate pre-tax book income minus the pre-tax book income of entity *i* at time *t* in U.S. $.	Amadeus
Parent$_{i,t}$	Dummy variable with a value of one if entity *i* is a parent firm.	Amadeus
Public$_{i,t}$	Dummy variable with a value of one if entity *i* is a publicly listed firm.	Amadeus
EM$_{i,t}$*1* to *EM4*$_{i,t}$	Proxy variables for earnings management calculated at the level of entity *i* at time *t* as suggested by Burgstahler et al. (2006). In our baseline specification EM1 (proxy for firms avoiding small losses) takes a value of one if the profit/loss of the observations lies in the range of +/-2 percent of total assets. In alternative specifications in the Online Appendix, we also use ranges of +/- 1 percent (Table A2) and +/- 3 percent (Table A3). For all other proxies, we define high earnings management observations as those in the most extreme quartile that corresponds with a greater likelihood of earnings management. In the Online Appendix, we alternatively also rely on quintiles (Table A2) and terciles (Table A3). EM2 is defined as the ratio of accruals to cashflow. If available, we calculate accruals as the difference of pre-tax profit and cashflow. Otherwise, we use the approach of Dechow et al. (1995) to calculate accruals. EM 3 is defined as the standard deviation of operating profit (EBIT) divided by the standard deviation of cashflow. EM4 describes the spearman correlation coefficient between relative changes in accruals and relative changes in cashflow calculated on a country-industry-year level with industry defined by the 2-digit NACE code.	Amadeus
Low growth$_{i,t}$ and *High debt*$_{i,t}$	We define high earnings management observations as those in the most extreme quartile that corresponds with a greater likelihood of earnings management. In the Online Appendix, we alternatively also rely on quintiles (Table A2) and terciles (Table A3). Low growth takes a value of one for observation with the lowest real GDP growth. High debt takes a value of one for observations with the highest ratio of long-term debt to total assets.	
Country level control variables		
Log GDP$_{j,t}$	Gross domestic product of an entity *i*'s host country *j* in U.S. $.	World Bank
Log GDP per Capita$_{j,t}$	Gross domestic product of an entity *i*'s host country *j* per capita in U.S. $.	World Bank

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APPENDIX 3: LIST OF TAX HAVEN JURISDICTIONS

In OECD (2009), the following jurisdictions are mentioned as a tax haven:

Andorra	Marshall Islands
Anguilla	Monaco
Antigua and Barbuda	Montserrat
Aruba	Nauru
Bahamas	Netherlands
Bahrain	Antilles
Belize	Niue
Bermuda	Panama
British Virgin Islands	St Kitts and Nevis
Cayman Islands	St Lucia
Cook Islands	St Vincent & Grenadines
Dominica	Samoa
Gibraltar	San Marino
Grenada	Turks and Caicos Islands
Liberia	Vanuatu
Liechtenstein	

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Figure 1: Graphical Evidence for Parallel Trends

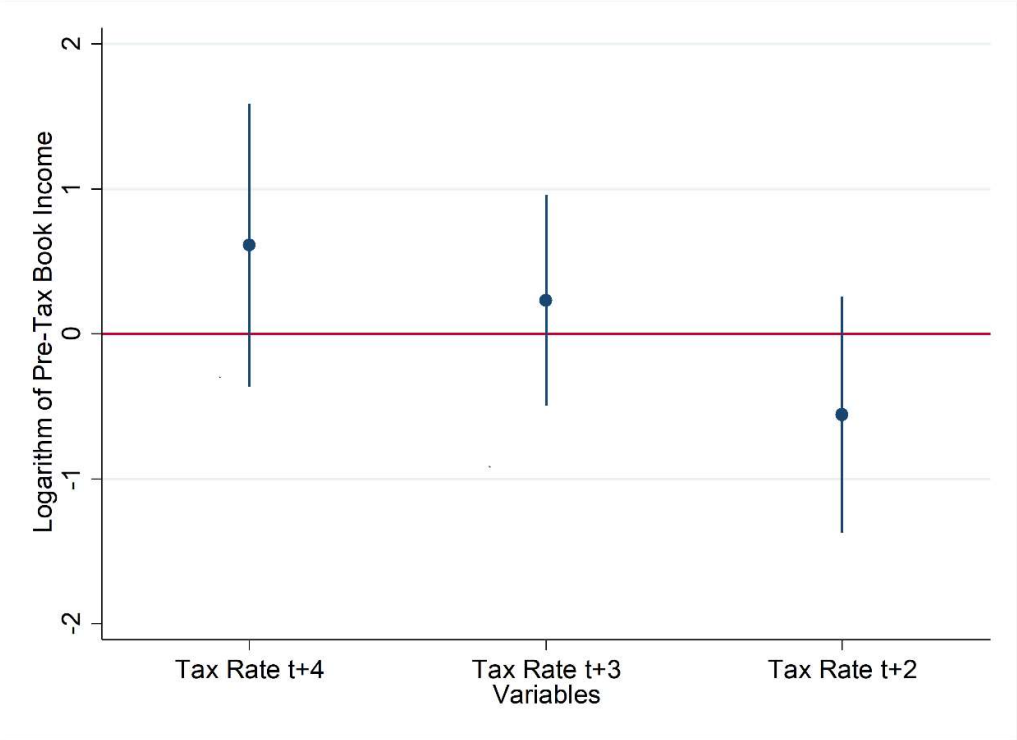

Figure 1 provides evidence for the parallel trends assumption for the generalized difference-in-differences design described in eq. (1). In particular, it evaluates whether there were differing trends in pre-tax book income across treated entities and control entities in the periods leading up to the treatment (a tax rate change). The analysis producing the estimates above by replacing $Tax\ Rate_{i,t}$ with leads for 4 years to 2 years-ahead tax rate in eq (1) to evaluate the differences in the fourth, third, and second year before the tax rate change. We do not include the rate for the year just prior to the tax rate change given that the prior literature on intertemporal income shifting (as one form of activity that can be used with conforming tax avoidance) also would be reflected in the period just before the tax rate change (e.g., Guenther 1994; Maydew 1997). The figure above plots the coefficient estimates and confidence intervals for the tax rate lead variables in this analysis.

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Table 1: Sample construction and country-level composition

Panel A: Sample selection

	Subsidiaries		Parents		Total	
Selection process	**Firms**	**Obs.**	**Firms**	**Obs.**	**Firms**	**Obs.**
Firms identified	1,237,499		331,431		1,568,956	
Residence in EU-28	1,062,510		331,431		1,393,941	
Data available	770,840		303,348		1,074,188	
Active firms	759,848		303,348		1,063,196	
No financial institution/insurance	543,533		169,164		712,697	
Not parent & subsidiary	533,296		155,038		688,334	
Reliable MNE status	433,591		141,244		575,835	
Complete accounting data	278,423	1,434,504	78,876	447,829	357,299	1,882,333
Tax planning incentive	234,336	997,794	67,207	310,129	301.543	1,307,923
Local GAAP statements	232,616	921,243	62,658	264,861	286,274	1,186,104
Global ultimate owner	214,902	891,138	62,502	264,264	277,404	1,155,402
No micro firms	144,377	727,113	45,338	247,620	189.715	974,733
Sufficient observations per cluster	139,722	697,068	45,056	240,551	184,778	937,619
No MNEs	76,738	363,333	36,242	191,506	112,980	554,839
Total	76,738	363,333	36,242	191,506	112,980	554,839

'Firms identified': Amadeus database has been searched for active firms in an EU-28 country that are marked as global ultimate owner (GUO); subsidiaries are all firms that are recorded in Amadeus as a subsidiary of the GUO up to the 10th level. *'Residence in EU-28':* Affiliates were dropped if resident outside EU-28. *'Data available'*: Firms were dropped if AMADEUS does not provide the firm's company, accounting, or status data. *'Active firms*': entity observations were dropped if not marked as 'active' (e.g., due to bankruptcy, insolvency). '*No financial institutions/insurances'*: Firms with 2-digit NACE codes 64, 65 or 66 are excluded. *'Not parent & subsidiary'*: Entities are dropped if they are a parent as well as a subsidiary. *'Reliable MNE status'*: A firm is classified as a domestic firm if no relationship to a foreign firm is identified. A firm is categorized as MNE firm if either the parent or another majority owned group entity is resident abroad. All other firms are excluded. *'Complete accounting information'*: Observations are excluded if financial statement data is incomplete or implausible (e.g., negative fixed assets, total assets or employee costs). Additionally, observations are excluded if the reporting period does not equal 12 months, as the analysis also uses flow figures that depend on the length of the reporting period. *'Tax planning incentive'*: Only public and private limited companies are included. All other legal forms are dropped (e.g., nonprofit organizations, public authorities). *'Local GAAP statements'*: IFRS statements are excluded. *'Global ultimate owner'*: The global ultimate owner (GUO, respectively the parent) can be identified and has a minimum shareholding of more than 50%; firms without a majority global ultimate owner or inconsistent data on the GUO (including foreign GUOs) are excluded. *'No micro firms'*: We exclude all firm observations with total assets below $500,000. *'Sufficient observations per cluster'*: We exclude observations in country–industry combinations (based on one-digit SIC codes) that do not have at least 30 observations. *'No MNEs'*: We exclude all observations of multinational firms in our sample.

Panel B: Observations by country and parent status

Country	**Subsidiaries**	**Parents**	**Total**
Austria	1,552	770	2,322
Belgium	69,807	20,046	89,853
Bulgaria	5,336	5,908	11,244
Croatia	57	614	671
Czech Republic	5,069	10,760	15,829
Denmark	16,858	13,105	29,963
Estonia	1,571	1,053	2,624
Finland	7,856	7,811	15,667
France	43,195	14,516	57,711
Germany	16,858	13,105	29,963
Hungary	553	301	854
Ireland	597	562	1,159
Italy	3,007	18,139	21,146
Latvia	19	15	34
Luxembourg	23	28	51
Netherlands	12,296	431	12,727
Poland	3,623	5,780	9,403
Portugal	834	2,652	3,486
Romania	2,837	4,126	6,963
Slovakia	1,639	2,220	3,859
Slovenia	1,860	882	2,742
Spain	39,992	26,024	66,016
Sweden	62,004	45,748	107,752
United Kingdom	35,208	7,958	43,166
Total	363,333	191,506	554,839

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Table 2: Tax rates per country and year

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Austria	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
Belgium	33.99%	33.99%	33.99%	33.99%	33.99%	33.99%	33.99%	33.99%	33.99%	33.99%	33.99%	33.99%	33.99%	29.00%	29.00%	29.00%
Bulgaria	15.00%	15.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Croatia	20.32%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	18.00%	18.00%	18.00%
Czech Republic	26.00%	24.00%	24.00%	21.00%	20.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%
Denmark	28.00%	28.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	24.50%	22.00%	22.00%	22.00%	22.00%	22.00%	22.00%
Estonia	24.00%	23.00%	22.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Finland	26.00%	26.00%	26.00%	26.00%	26.00%	26.00%	26.00%	24.50%	24.50%	24.50%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
France	33.83%	33.33%	33.33%	33.33%	33.33%	33.33%	33.33%	33.33%	33.33%	33.33%	33.33%	33.33%	33.33%	33.00%	31.00%	28.00%
Germany	38.31%	38.34%	38.36%	29.51%	29.44%	29.41%	29.37%	29.48%	29.55%	29.58%	29.72%	29.72%	29.72%	30.00%	30.00%	30.00%
Hungary	16.00%	16.00%	16.00%	16.00%	16.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Ireland	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%
Italy	37.25%	37.25%	37.25%	31.40%	31.40%	31.40%	31.40%	31.40%	31.40%	31.40%	31.40%	31.40%	24.00%	24.00%	24.00%	24.00%
Luxembourg	30.38%	29.63%	29.63%	29.63%	28.59%	28.59%	28.80%	28.80%	29.22%	29.22%	29.22%	29.22%	27.08%	26.01%	24.94%	24.94%
Latvia	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	20.00%	20.00%	20.00%
Netherlands	31.50%	29.60%	25.50%	25.50%	25.50%	25.50%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
Poland	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%
Portugal	27.50%	27.50%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	23.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%
Romania	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%
Slovakia	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	23.00%	22.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%
Slovenia	25.00%	25.00%	23.00%	22.00%	21.00%	20.00%	20.00%	18.00%	17.00%	17.00%	17.00%	17.00%	19.00%	19.00%	19.00%	19.00%
Spain	35.00%	35.00%	32.50%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	28.00%	25.00%	25.00%	25.00%	25.00%	25.00%
Sweden	28.00%	28.00%	28.00%	28.00%	26.30%	26.30%	26.30%	26.30%	22.00%	22.00%	22.00%	22.00%	22.00%	22.00%	21.40%	21.40%
United Kingdom	30.00%	30.00%	30.00%	30.00%	28.00%	28.00%	26.00%	24.00%	23.00%	21.00%	20.00%	20.00%	19.00%	19.00%	19.00%	19.00%

Table 2 reports the corporate income statutory tax rates that include the top federal rates as well as average local taxes and surtaxes by country and year. Tax rates are taken from KPMG (2006) and KPMG's corporate tax rate tables available at: https://home.kpmg/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html.

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Table 3: Descriptive statistics

Variables	Obs.	Mean	Median	St. Dev.	Pct. 5th	Pct. 25th	Pct. 75th	Pct. 95th
Panel A: Full Sample								
Pre-tax book income[a]	554,839	1,035	241	10,265	11.3	80.0	699	3,320
Total assets[a]	554,839	13,627	3,297	134,956	625	1,329	9,147	37,509
Total compensation[a]	554,839	2,500	773	15,637	46.6	273	2,120	8,630
Statutory tax rate[b]	554,839	26.46	25.00	5.83	19.00	22.00	31.40	33.99
GDP[c]	554,839	1,189	541	1,073	188	462	2,197	3,358
GDP per capita[a]	554,839	42.13	44.20	13.08	15.26	36.35	51.94	60.76
Panel B: Subsidiaries								
Pre-tax book income[a]	363,333	1,042	247	9,963	11.9	83.8	704	3,277
Total assets[a]	363,333	12,930	2,989	144,364	614	1,250	8,381	33,530
Total compensation[a]	363,333	2,500	773	15,637	62.1	346	2,331	8,809
Statutory tax rate[b]	363,333	26.44	25.00	5.64	19.00	22.00	33.00	33.99
GDP[c]	363,333	1,196	541	1,073	241	471	2,439	3,106
GDP per capita[a]	363,333	44.00	44.76	11.97	20.63	38.78	52.20	61.06
Panel C: Parents								
Pre-tax book income[a]	191,506	1,021	230	10,817	10.2	73.4	687	3,406
Total assets[a]	191,506	14,951	3,965	114,998	649	1,519	10,761	45,482
Total compensation[a]	191,506	2,246	553	9,286	32.1	174	1,693	8,259
Statutory tax rate[b]	191,506	26.51	26.30	6.19	16.00	22.00	31.40	35.00
GDP[c]	191,506	1,176	552	1,073	94.3	437	2,136	3,426
GDP per capita[a]	191,506	38.58	41.57	14.31	10.08	28.17	48.30	60.02

Table 3 reports descriptive statistics for the main analysis sample used with equation (1).

[a] In thousands of U.S. dollars, using current prices.

[b] Top statutory corporate tax rates in percent including average local taxes and surtaxes.

[c] In billions of U.S. dollars, using current prices.

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Table 4: Baseline Tests for Conforming Tax Avoidance

Dependent variable	***Log PTI***					
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Specification	**Baseline with Alternative FE**				**No controls for investment**	**More specific controls for investment**
Tax Rate	**-1.706*** **	**-1.483*** **	**-1.461*** **	**-1.441*** **	**-1.956*** **	**-1.525*** **
	(-6.808)	**(-5.537)**	**(-5.596)**	**(-5.469)**	**(-6.971)**	**(-4.445)**
Log Assets	0.770***	0.816***	0.752***	0.821***		
	(66.538)	(31.594)	(65.054)	(29.761)		
Log Compensation	0.160***	0.121***	0.153***	0.117***		
	(18.924)	(8.856)	(17.195)	(8.809)		
Log GDP	3.805***	3.230***	3.198***	3.077***	3.921***	4.034***
	(10.640)	(5.519)	(6.053)	(5.512)	(6.818)	(5.856)
Log GDP per capita	-3.290***	-2.774***	-2.729***	-2.620***	-2.763***	-3.007***
	(-9.947)	(-4.827)	(-5.282)	(-4.814)	(-5.011)	(-4.591)
Log Lagged Fixed Assets						0.047***
						(7.091)
Log Investment						0.054***
						(10.408)
Parent	-0.134***					
	(-6.578)					
Public	-0.032					
	(-0.772)					
Firm FE		√		√	√	√
Group FE			√	√		
Country FE	√					
Industry FE	√					
Year FE	√	√	√	√	√	√
Observations	554,839	554,839	554,839	554,839	554,839	294,383
Number of firms	112,980	112,980	112,980	112,980	112,980	84,323
R^2	0.462	0.771	0.724	0.779	0.754	0.803

Table 4 reports coefficient estimates and t statistics (in parentheses) for our baseline conforming tax avoidance analysis with equation (1). Standard errors are robust and clustered at the country–industry level, with industry based on one-digit SIC codes. The firm fixed effects consider a fixed effect for each entity in our sample. We provide variable definitions in Appendix 2. *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.

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Table 5: Tests to Evaluate the Role of Negative Weights in the Baseline Analysis

Dependent variable					***Log PTI***			
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
***Tax Rate Decrease* Specification**	**Specification 1**		**Specification 2**		**Specification 3**		**Specification 4**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Tax Rate Decrease	**0.084*** **		**0.095*** **		**0.119*** **		**0.089*** **	
	(2.930)		**(2.757)**		**(6.249)**		**(4.371)**	
Tax Rate		**-1.754*** **		**-1.368*** **		**-1.682*** **		**-1.608*** **
		(-3.688)		**(-2.205)**		**(-6.033)**		**(-5.719)**
% of ATTs with Negative Weights	23.75	N/A	33.61	N/A	37.65	N/A	38.36	N/A
Firm & Country Controls	√	√	√	√	√	√	√	√
Firm & Year FE	√	√	√	√	√	√	√	√
Observations	151,578	151,578	206,150	206,150	453,496	453,496	489,639	489,639
Number of firms	24,921	24,921	45,851	45,851	106,043	106,043	96,967	96,967
R^2	0.774	0.774	0.791	0.791	0.782	0.782	0.768	0.768

Table 5 reports coefficient estimates and t statistics (in parentheses) for our staggered DiD analysis with *Tax Rate Decrease* as dummy variable for the only relevant (most significant) tax rate decreases in the timeline in odd columns. See Appendix 2 for additional detail on the definition of *Tax Rate Decrease* across specifications 1-4. In the even columns, we also present estimates for *Tax Rate* from equation (1) with the corresponding sample restrictions to define *Tax Rate Decrease* across specifications 1-4. Standard errors are robust and clustered at the country–industry level, with industry based on one-digit SIC codes. The firm fixed effects consider a fixed effect for each entity in our sample. We provide variable definitions in Appendix 2. *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.

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Table 6: Validation Tests to Consider Spurious Demand for Earnings Management

Dependent variable:	***Log PTI***					
Panel A: Exclusion of observations with high value of restriction						
Exclusion restriction	**Earnings management proxies corresponding to Burgstahler et al. (2006)**				**Low growth and high debt proxies**	
Exclusion proxy	**EM1**	**EM2**	**EM3**	**EM4**	**Low growth**	**High debt**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Tax Rate	**-1.304*** **	**-1.593*** **	**-1.426*** **	**-1.513*** **	**-1.945*** **	**-1.298*** **
	(-3.776)	**(-6.510)**	**(-4.239)**	**(-5.174)**	**(-5.612)**	**(-4.054)**
Log Assets	0.790***	0.784***	0.817***	0.818***	0.828***	0.921***
	(33.246)	(31.645)	(33.941)	(29.397)	(29.048)	(34.649)
Log Compensation	0.104***	0.127***	0.125***	0.119***	0.113***	0.113***
	(8.356)	(8.226)	(9.759)	(8.480)	(6.995)	(8.722)
Log GDP	2.486***	3.375***	3.205***	3.097***	3.311***	2.490***
	(4.284)	(5.507)	(5.064)	(4.958)	(5.288)	(3.559)
Log GDP per Capita	-2.044***	-2.875***	-2.805***	-2.638***	-2.910***	-2.242***
	(-3.777)	(-4.674)	(-4.534)	(-4.314)	(-4.833)	(-3.294)
Firm & Year FE	√	√	√	√	√	√
Observations	484,403	464,440	426,947	499,277	417,334	414,206
Number of firms	81,319	78,551	101,319	62,249	104,669	84,695
R^2	0.806	0.776	0.786	0.771	0.793	0.787
Panel B: Exclusion of observations with high value or missing information on restriction						
Exclusion restriction	**Earnings management proxies corresponding to Burgstahler et al. (2006)**				**Low growth and high debt proxies**	
Exclusion proxy	**EM1**	**EM2**	**EM3**	**EM4**	**Low growth**	**High debt**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Tax Rate	**-0.923*** **	**-1.825*** **	**-1.206*** **	**-1.089** **	**-1.945*** **	**-1.198*** **
	(-4.100)	**(-5.289)**	**(-3.337)**	**(-2.232)**	**(-5.612)**	**(-3.202)**
Log Assets	0.847***	0.793***	0.819***	0.886***	0.828***	0.934***
	(25.579)	(23.287)	(31.993)	(17.802)	(29.048)	(33.290)
Log Compensation	0.084***	0.133***	0.118***	0.130***	0.113***	0.109***
	(5.221)	(6.011)	(9.532)	(5.807)	(6.995)	(7.538)
Log GDP	2.122***	3.911***	3.384***	3.621***	3.311***	2.728***
	(3.896)	(4.834)	(5.063)	(4.412)	(5.288)	(3.577)
Log GDP per Capita	-1.771***	-3.369***	-3.009***	-3.132***	-2.910***	-2.508***
	(-3.453)	(-4.272)	(-4.593)	(-4.049)	(-4.833)	(-3.400)
Firm & Year FE	√	√	√	√	√	√
Observations	313,580	275,155	402,313	201,110	417,334	344,298
Number of firms	81,319	78,551	101,319	62,249	104,669	84,695
R^2	0.843	0.793	0.787	0.807	0.793	0.795

Table 6 reports coefficient estimates and t statistics (in parentheses) for equation (1) excluding observations in the top quartile of the selected exclusion restriction. An exception is EM1 that identifies firms with close-to-zero profits (profit/loss ranging from +/- 1% of total assets). As exclusion restrictions, we first consider four proxies to identify earnings management (measured by EM proxies from Burgstahler et al., 2006), low real economic growth (proxied by real GDP growth in country *j*), or high debt (proxied by debt to total assets of entity *i*). In Panel A, we exclude only observations specifically identified as having a high likelihood of earnings management. In Panel B, we then also exclude observations with insufficient information to calculate the exclusion restriction proxies. Standard errors are robust and clustered at the country–industry level, with industry based on one-digit SIC codes. The firm fixed effects consider a fixed effect for each entity in our sample. We provide variable definitions in Appendix 2. *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.

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Table 7: Validation Tests with Explicit Tax Measures, Channels for CTA, and Book-tax Conformity

Dependent variable	***Conform tax***	***Tax to Assets***	***Discret. Cash flow***	***Log Reserves***	***Log Inv***	***Log PTI***	
BTaxC measure						**Watrin et al. (2012)**	**Tang (2015)**
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Tax Rate	**-0.012*** **	**0.029*** **	**0.067** **	**1.910*** **	**-0.380** **	**-1.260*** **	**-1.597*** **
	(-2.999)	**(3.463)**	**(2.219)**	**(3.864)**	**(-2.142)**	**(-4.576)**	**(-6.311)**
BTaxC Change × Tax Rate						**-0.087***	**-0.323*** **
						(-1.843)	**(-3.077)**
BTaxC Change						0.030**	0.094***
						(2.350)	(2.933)
Log Assets	0.009***	0.011***	0.089***	0.151***	0.080***	0.826***	0.825***
	(3.699)	(3.971)	(3.172)	(7.954)	(5.528)	(32.679)	(33.618)
Log Compensation	-0.001**	-0.001*	-0.028***	0.221***	0.416***	0.116***	0.116***
	(-2.015)	(-1.703)	(-3.268)	(10.251)	(24.923)	(9.300)	(9.537)
Log GDP	0.022*	0.080***	-0.199***	2.087***	0.039	3.148***	2.972***
	(1.807)	(5.065)	(-3.578)	(2.768)	(0.069)	(5.894)	(5.489)
Log GDP per capita	-0.019*	-0.066***	0.160***	-1.816**	0.156	-2.651***	-2.516***
	(-1.848)	(-4.790)	(3.634)	(-2.432)	(0.299)	(-5.036)	(-4.692)
Firm & Year FE	√	√	√	√	√	√	√
Observations	268,968	340,627	214,518	181,269	402,824	505,470	531,278
Number of firms	67,622	83,447	57,314	66,281	82,488	110,436	111,047
R^2	0.625	0.590	0.399	0.848	0.941	0.787	0.783

Table 7 reports coefficient estimates and t statistics (in parentheses) for our baseline conforming tax avoidance analysis with alternative dependent variables as proxies for tax avoidance (columns 1 and 2) or channels for conforming tax avoidance (columns 3 to 5). Columns 6 and 7 contain additional analysis on the association of conforming tax avoidance and book-tax conformity. In tests with reserves and inventory as the alternative outcomes of interest (col. 4 and 5), we use assets excluding reserves and inventory, respectively, to define *Log Assets*. The standard errors are robust and clustered at the country–industry level, with industry based on one-digit SIC codes. The firm fixed effects consider a fixed effect for each entity in our sample. We provide variable definitions in Appendix 2. *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.

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Table 8: Baseline Tests with Multinational Firms

Panel A: Descriptive Statistics

Variables	Obs.	Mean	Median	St. Dev.	Pct. 5th	Pct. 25th	Pct. 75th	Pct. 95th
Pre-tax book income[a]	382,780	8,091	879	82,866	34.0	251	3,055	21,707
Total assets[a]	382,780	95,453	10,793	780,268	948	3,644	33,675	248,722
Total compensation[a]	382,780	12,180	2,497	81,227	149	821	7,339	40,471
Statutory tax rate[b]	382,780	26.98	28.00	6.32	16.00	22.00	33.33	35.00
GDP[c]	382,780	1,483	1,196	1,218	94.3	386	2,675	3,527
GDP per capita[a]	382,780	37.39	41.10	13.55	12.40	28.39	46.25	57.61

Panel B: Baseline tests

Dependent variable	***Log PTI***						
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
	Cross Sectional FE	**Firm FE**	**Firm and Group FE**	**No controls for investment**	**More specific controls for investment**	**Controlling for profit shifting in the EU**	**MNEs with no tax havens**
Tax Rate	**-0.424****	**-0.652****	**-0.639*****	**-1.005*****	**-0.695*****	**-0.754*****	**-0.723*****
	(-1.992)	**(-2.548)**	**(-2.643)**	**(-4.536)**	**(-3.081)**	**(-3.306)**	**(-2.777)**
Log Assets	0.764***	0.680***	0.676***		0.756***	0.667***	0.701***
	(103.503)	(40.868)	(44.141)		(35.114)	(39.065)	(43.966)
Log Compensation	0.171***	0.196***	0.192***		0.238***	0.200***	0.186***
	(23.197)	(14.227)	(14.461)		(15.269)	(14.232)	(12.812)
Log GDP	-0.151	-0.020	0.062	0.791	-0.094	-0.145	0.035
	(-0.387)	(-0.044)	(0.155)	(1.558)	(-0.245)	(-0.345)	(0.082)
Log GDP per capita	0.044	-0.072	-0.125	-0.242	0.037	0.080	-0.209
	(0.127)	(-0.177)	(-0.337)	(-0.531)	(0.105)	(0.207)	(-0.529)
Parent	-0.156***						
	(-7.520)						
Public	0.136***						
	(10.378)						
Log Lagged Fixed Assets	-0.134***				-0.089***		
	(-6.578)				(-13.640)		
Log Investment	-0.032				-0.016***		
	(-0.772)				(-6.325)		
Log Group Profit						0.018***	
						(12.680)	
Exclude haven MNEs							√
Firm FE		√	√	√	√	√	√
Group FE			√				
Country FE	√						
Industry FE	√						
Year FE	√	√	√	√	√	√	√
Observations	382,780	382,780	382,780	382,780	218,194	292,217	281,423
Number of firms	71,798	71,798	71,798	71,798	56,175	62,580	54,429
R^2	0.634	0.845	0.851	0.830	0.829	0.821	0.829

Table 8 reports coefficient estimates and t statistics (in parentheses) for our baseline conforming tax avoidance analysis with equation (1) for multinational firms (a MNE sample). Standard errors are robust and clustered at the country–industry level, with industry based on one-digit SIC codes. The firm fixed effects consider a fixed effect for each entity in our sample. We provide variable definitions in Appendix 2. *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.

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ONLINE APPENDIX

Figure A1: Re-estimating Table 5 with a Stacked Cohort Design

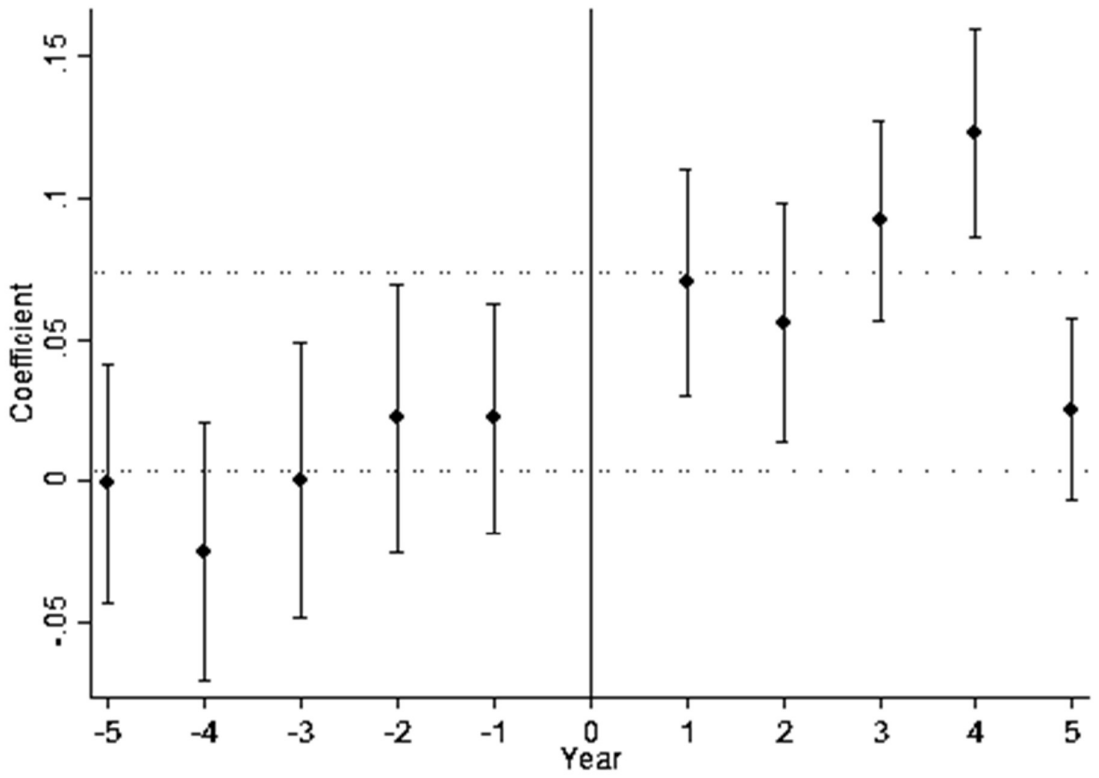

Figure A1 reports results with a stacked cohort DiD design in line with Cengiz et al. (2019), which is robust to potential concerns with heterogeneous treatment effects in a staggered DiD approach. The analysis requires a binary treatment variable. We use the *Tax Rate Decrease*$_{i,t}$ specification 4 sample that corresponds with Table 5 column 7 as this is closest to our baseline sample in Table 4. The analysis reports individual coefficient estimates and standard errors for the years surrounding the tax cut, which we use to report the confidence intervals above. We inserted the lower horizontal dotted line to show the (equal-weighted) average of the pre-period coefficient estimates, which is statistically indistinguishable from zero in support of the parallel trends assumption with this analysis. The upper horizontal dotted line is an (equal-weighted) average of the post-period coefficient estimates, 0.07, which is very similar to the corresponding coefficient estimate for *Tax Rate Decrease*$_{i,t}$ in column 7 of Table 5. Overall, the results suggest that the potential bias with a staggered DiD design does not drive the results in our main analysis.

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ONLINE APPENDIX

Table A1: Staggered DiD Tests Adding Group FE

Specification	**Specification 1**		**Specification 2**		**Specification 3**		**Specification 4**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Tax Rate Decrease	**0.088*** **		**0.086*** **		**0.111*** **		**0.080*** **	
	(3.231)		**(3.060)**		**(5.740)**		**(4.163)**	
Tax Rate		**-1.791*** **		**-1.468*** **		**-1.604*** **		**-1.611*** **
		(-3.937)		**(-2.824)**		**(-5.748)**		**(-5.823)**
Firm and country controls	√	√	√	√	√	√	√	√
Firm & Year FE	√	√	√	√	√	√	√	√
Group FE	√	√	√	√	√	√	√	√
Observations	151,578	151,578	206,150	206,150	453,496	453,496	489,639	489,639
Number of firms	24,921	24,921	45,851	45,851	106,043	106,043	96,967	96,967
R^2	0.780	0.780	0.802	0.802	0.790	0.790	0.776	0.776

Table A1 re-estimates Table 5 after adding group fixed effects. Standard errors are robust and clustered at the country–industry level, with industry based on one-digit SIC codes. The firm fixed effects consider a fixed effect for each entity in our sample. We provide variable definitions in Appendix 2. *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.

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Table A2: Validation Tests for Spurious Earnings Management using a Quintile Threshold

Dependent variable:	***Log PTI***					
Panel A: Exclusion of observations with high value of restriction						
Exclusion restriction	**Earnings management proxies corresponding to Burgstahler et al. (2006)**				**Low growth and high debt proxies**	
Exclusion proxy	**EM1**	**EM2**	**EM3**	**EM4**	**Low growth**	**High debt**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Tax Rate	**-1.351*** **	**-1.647*** **	**-1.495*** **	**-1.516*** **	**-1.867*** **	**-1.326*** **
	(-4.511)	**(-6.827)**	**(-4.812)**	**(-5.306)**	**(-5.796)**	**(-4.095)**
Firm & Country Controls	√	√	√	√	√	√
Firm & Year FE	√	√	√	√	√	√
Observations	515,277	484,605	453,526	511,043	444,469	442,727
Number of firms	***93,206***	***39,098***	***92,790***	***39,020***	***104,031***	***50,747***
R^2	0.795	0.774	0.782	0.770	0.788	0.784
Panel B: Exclusion of observations with high value or missing information on restriction						
Exclusion restriction	**Earnings management proxies corresponding to Burgstahler et al. (2006)**				**Low growth and high debt proxies**	
Exclusion proxy	**EM1**	**EM2**	**EM3**	**EM4**	**Low growth**	**High debt**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Tax Rate	**-1.063*** **	**-1.742*** **	**-1.247*** **	**-0.989** **	**-1.867*** **	**-1.243*** **
	(-4.286)	**(-5.109)**	**(-3.466)**	**(-2.253)**	**(-5.796)**	**(-3.313)**
Firm & Country Controls	√	√	√	√	√	√
Firm & Year FE	√	√	√	√	√	√
Observations	344,454	295,320	428,892	212,876	444,469	372,819
Number of firms	81,319	78,551	101,319	62,249	104,669	84,695
R^2	0.829	0.790	0.784	0.806	0.788	0.791

Table A2 reports coefficient estimates and t statistics (in parentheses) for equation (1) excluding observations in the most extreme quintile of the alternative earnings management (EM) proxies. An exception is EM1 that identifies firms with close-to-zero profits (profit/loss ranging from +/- 1% of total assets). As exclusion restrictions, we consider high earnings management (measured by the four EM proxies in Burgstahler et al. 2006), low real economic growth (proxied by real GDP growth in country *j*), or high debt (proxied by debt to total assets of entity *i*). In Panel A, we exclude only observations specifically identified as having a high likelihood of earnings management. In Panel B, we then also exclude observations with insufficient information to calculate the exclusion restriction proxies. Standard errors are robust and clustered at the country–industry level, with industry based on one-digit SIC codes. The firm fixed effects consider a fixed effect for each entity in our sample. We provide variable definitions in Appendix 2. *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.

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Table A3: Validation Tests for Spurious Earnings Management using a Tercile Threshold

Dependent variable:	***Log PTI***					
Panel A: Exclusion of observations with high value of restriction						
Exclusion restriction	**Earnings management proxies corresponding to Burgstahler et al. (2006)**				**Low growth and high debt proxies**	
Exclusion proxy	**EM1**	**EM2**	**EM3**	**EM4**	**Low growth**	**High debt**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Tax Rate	**-1.316*** **	**-1.392*** **	**-1.354*** **	**-1.394*** **	**-2.046*** **	**-1.248*** **
	(-3.388)	**(-4.617)**	**(-3.785)**	**(-4.522)**	**(-5.683)**	**(-3.798)**
Firm & Country Controls	√	√	√	√	√	√
Firm & Year FE	√	√	√	√	√	√
Observations	456,571	432,231	382,063	482,118	373,239	369,374
Number of firms	93,206	39,098	92,790	39,020	104,031	50,747
R^2	0.814	0.781	0.792	0.773	0.795	0.793
Panel B: Exclusion of observations with high value or missing information on restriction						
Exclusion restriction	**Earnings management proxies corresponding to Burgstahler et al. (2006)**				**Low growth and high debt proxies**	
Exclusion proxy	**EM1**	**EM2**	**EM3**	**EM4**	**Low growth**	**High debt**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Tax Rate	**-0.790*** **	**-1.790*** **	**-1.191*** **	**-0.595**	**-2.046*** **	**-1.146*** **
	(-3.047)	**(-4.861)**	**(-3.146)**	**(-1.133)**	**(-5.683)**	**(-2.944)**
Firm & Country Controls	√	√	√	√	√	√
Firm & Year FE	√	√	√	√	√	√
Observations	285,748	242,946	357,429	183,951	373,239	299,466
Number of firms	81,319	78,551	101,319	62,249	104,669	84,695
R^2	0.855	0.801	0.792	0.809	0.795	0.802

Table A3 reports coefficient estimates and t statistics (in parentheses) for equation (1) excluding observations in the most extreme quintile of the alternative earnings management (EM) proxies. An exception is EM1 that identifies firms with close-to-zero profits (profit/loss ranging from +/- 3% of total assets). As exclusion restrictions, we consider high earnings management (measured by the four EM proxies from Burgstahler et al. 2006), low real economic growth (proxied by real GDP growth in country *j*), or high debt (proxied by debt to total assets of entity *i*). In Panel A, we exclude only observations specifically identified as having a high likelihood of earnings management. In Panel B, we then also exclude observations with insufficient information to calculate the exclusion restriction proxies. Standard errors are robust and clustered at the country–industry level, with industry based on one-digit SIC codes. The firm fixed effects consider a fixed effect for each entity in our sample. We provide variable definitions in Appendix 2. *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.

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Table A4: Validation Tests for Spurious Earnings Management Adding Group FE

Dependent variable:	***Log PTI***					
Panel A: Exclusion of observations with high value of restriction						
Exclusion restriction	**Earnings management proxies corresponding to Burgstahler et al. (2006)**				**Low growth and high debt proxies**	
Exclusion proxy	**EM1**	**EM2**	**EM3**	**EM4**	**Low growth**	**High debt**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Tax Rate	**-1.245*** **	**-1.585*** **	**-1.373*** **	**-1.496*** **	**-1.928*** **	**-1.249*** **
	(-3.522)	**(-6.264)**	**(-4.254)**	**(-5.107)**	**(-5.310)**	**(-4.158)**
Firm & Country Controls	√	√	√	√	√	√
Group, Firm, & Year FE	√	√	√	√	√	√
Observations	484,403	464,440	426,947	499,277	417,334	414,206
Number of firms	81,319	78,551	101,319	62,249	104,669	84,695
R^2	0.814	0.784	0.795	0.779	0.802	0.796
Panel B: Exclusion of observations with high value or missing information on restriction						
Exclusion restriction	**Earnings management proxies corresponding to Burgstahler et al. (2006)**				**Low growth and high debt proxies**	
Exclusion proxy	**EM1**	**EM2**	**EM3**	**EM4**	**Low growth**	**High debt**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Tax Rate	**-0.890*** **	**-1.804*** **	**-1.124*** **	**-1.049** **	**-1.928*** **	**-1.090*** **
	(-3.753)	**(-5.407)**	**(-3.264)**	**(-2.157)**	**(-5.310)**	**(-3.258)**
Firm & Country Controls	√	√	√	√	√	√
Group, Firm, & Year FE	√	√	√	√	√	√
Observations	313,580	275,155	402,313	201,110	417,334	344,298
Number of firms	81,319	78,551	101,319	62,249	104,669	84,695
R^2	0.849	0.800	0.796	0.813	0.802	0.801

Table A4 reports coefficient estimates and t statistics (in parentheses) from Table 6 excluding observations in the most extreme quartile of the earnings management (EM) proxies and with the addition of group fixed effects. An exception with the EM threshold is EM1 that identifies firms with close-to-zero profits (profit/loss ranging from +/- 2% of total assets). As exclusion restrictions, we consider high earnings management (measured by the four EM proxies from Burgstahler et al. 2006), low real economic growth (proxied by real GDP growth in country *j*), or high debt (proxied by debt to total assets of entity *i*). In Panel A, we exclude only observations specifically identified as having a high likelihood of earnings management. In Panel B, we then also exclude observations with insufficient information to calculate the exclusion restriction proxies. Standard errors are robust and clustered at the country–industry level, with industry based on one-digit SIC codes. The firm fixed effects consider a fixed effect for each entity in our sample. We provide variable definitions in Appendix 2. *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.

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Table A5: Validation Tests for Earnings Management Using Exclusion Restrictions as Controls

Dependent variable:	***Log PTI***						
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Tax Rate	**-1.134*** **	**-1.367*** **	**-1.180*** **	**-1.246*** **	**-1.131*** **	**-1.423*** **	**-1.429*** **
	(-4.043)	**(-5.280)**	**(-3.947)**	**(-4.736)**	**(-4.009)**	**(-6.064)**	**(-5.077)**
EM1	0.000***	0.000***					
	(8.448)	(10.320)					
EM2	0.000		0.000				
	(0.054)		(1.561)				
EM3	0.000			0.000**			
	(0.664)			(1.974)			
EM 4	-0.082***				-0.065***		
	(-4.564)				(-2.994)		
Real GDP Growth	-1.460***					-1.709***	
	(-4.455)					(-5.682)	
Debt to Assets	-0.203						-0.411
	(-1.188)						(-1.446)
Firm & Country Controls	√	√	√	√	√	√	√
Firm & Year FE	√	√	√	√	√	√	√
Observations	222,839	384,016	365,554	530,205	256,672	554,839	484,931
Number of firms	62,001	89,231	85,482	111,373	69,399	112,980	102,950
R^2	0.814	0.797	0.786	0.772	0.808	0.771	0.776

Table A5 reports coefficient estimates and t statistics (in parentheses) for Table 6 if instead of excluding the most extreme EM observations we control for the continuous measures we use to identify the likelihood of EM. Standard errors are robust and clustered at the country–industry level, with industry based on one-digit SIC codes. The firm fixed effects consider a fixed effect for each entity in our sample. We provide variable definitions in Appendix 2. *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.

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Table A6: Reserve Channel Test Excluding High Earnings Management Observations

Dependent variable:	***Log Reserves***					
Panel A: Exclusion of observations with high value of restriction						
Exclusion restriction	**Earnings management proxies corresponding to Burgstahler et al. (2006)**				**Low growth and high debt proxies**	
Exclusion proxy	**EM1**	**EM2**	**EM3**	**EM4**	**Low growth**	**High debt**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Tax Rate	**1.573*** **	**1.916*** **	**2.148*** **	**2.138*** **	**2.018*** **	**1.691*** **
	(2.907)	**(4.020)**	**(4.191)**	**(4.186)**	**(4.484)**	**(3.705)**
Firm & Country Controls	√	√	√	√	√	√
Firm & Year FE	√	√	√	√	√	√
Observations	145,174	152,203	133,357	153,498	133,103	132,794
Number of firms	57,931	61,879	56,413	63,520	57,874	52,890
R^2	0.851	0.859	0.862	0.853	0.869	0.847
Panel B: Exclusion of observations with high value or missing information on restriction						
Exclusion restriction	**Earnings management proxies corresponding to Burgstahler et al. (2006)**				**Low growth and high debt proxies**	
Exclusion proxy	**EM1**	**EM2**	**EM3**	**EM4**	**Low growth**	**High debt**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Tax Rate	**1.537** **	**2.379*** **	**2.327*** **	**2.496*** **	**2.018*** **	**1.907*** **
	(2.530)	**(3.477)**	**(4.546)**	**(5.623)**	**(4.484)**	**(4.454)**
Firm & Country Controls	√	√	√	√	√	√
Firm & Year FE	√	√	√	√	√	√
Observations	133,813	107,949	129,719	82,253	133,103	126,932
Number of firms	54,329	49,472	55,689	39,818	57,874	50,744
R^2	0.854	0.879	0.863	0.868	0.869	0.848

Table A6 reports Table 7 column (4), equation (1) with *Log* Reserves as the outcome for a channel of conforming tax avoidance, excluding observations in the most extreme quartile of values associated with earnings management. An exception is EM1 that identifies firms with close-to-zero profits (profit/loss ranging from +/- 2% of total assets). As exclusion restrictions, we consider high earnings management (measured by four EM proxies from Burgstahler et al., 2006), low real economic growth (proxied by real GDP growth in country *j*), or high debt (proxied by debt to total assets of entity *i*). In Panel A, we exclude only observations specifically identified as having a high likelihood of earnings management. In Panel B, we then also exclude observations with insufficient information to calculate the exclusion restriction proxies. We adjust the *Log Assets* control throughout to exclude reserves given reserves are the outcome of interest in this table. Standard errors are robust and clustered at the country–industry level, with industry based on one-digit SIC codes. The firm fixed effects consider a fixed effect for each entity in our sample. We provide variable definitions in Appendix 2. *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.

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Table A7: Validation Tests with Explicit Tax Measures, Channels for CTA, and Book-tax Conformity Adding Group FE

Dependent variable	***Conform tax***	***Tax to Assets***	***Discret. Cash flow***	***Log Reserves***	***Log Inv***	***Log PTI***	
BTaxC measure						**Watrin et al. (2012)**	**Tang (2015)**
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Tax Rate	**-0.013*** **	**0.027*** **	**0.076** **	**2.210*** **	**-0.508** **	**-1.151*** **	**-1.548*** **
	(-3.234)	**(2.843)**	**(2.013)**	**(3.490)**	**(-2.487)**	**(-3.927)**	**(-5.525)**
BTaxC Change × Tax Rate						**-0.077**	**-0.290** **
						(-1.446)	**(-2.460)**
Firm & country controls	√	√	√	√	√	√	√
Group, Firm, & Year FE	√	√	√	√	√	√	√
Observations	268,968	340,627	214,518	181,269	402,824	505,470	531,278
Number of firms	67,622	83,447	57,314	66,281	82,488	110,436	111,047
R^2	0.634	0.602	0.403	0.854	0.945	0.787	0.783

Table A7 reports coefficient estimates and t statistics (in parentheses) for Table 7 with the addition of group fixed effects. In tests with reserves and inventory as the alternative outcomes of interest (col. 4 and 5), we use assets excluding reserves and inventory, respectively, to define *Log Assets*. The standard errors are robust and clustered at the country–industry level, with industry based on one-digit SIC codes. The firm fixed effects consider a fixed effect for each entity in our sample. We provide variable definitions in Appendix 2. *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively.

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